AVIATION WEEK

JAN. 21, 1952

A McGRAW-HILL PUBLICATION

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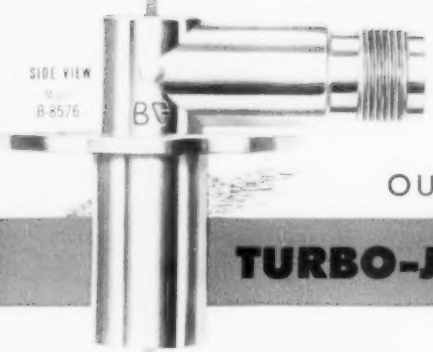
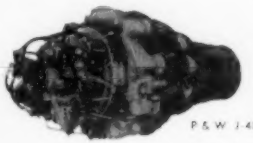


OUR ARMED FORCES RELY ON

TURBO-JET IGNITERS BY BG



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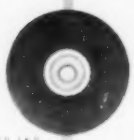

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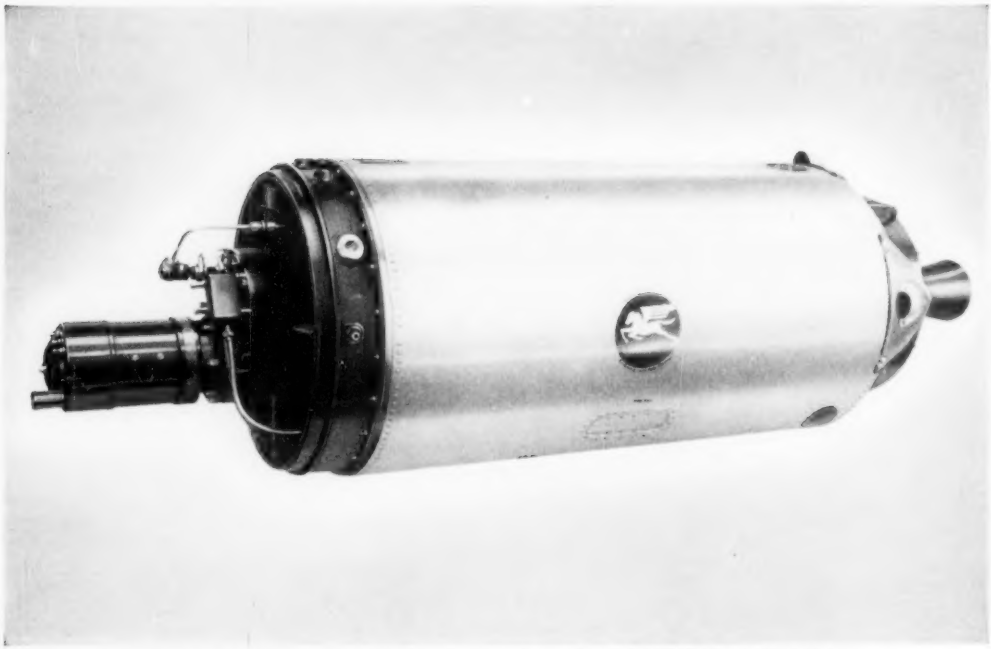

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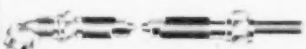

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Aviation Week

ABP Member ABC

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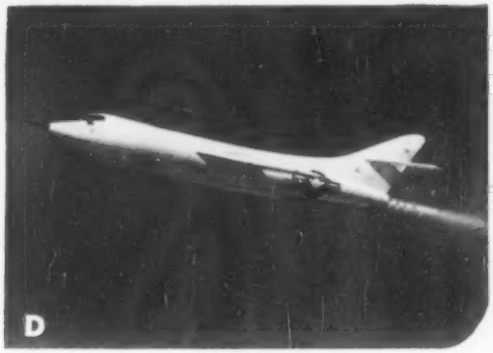
DO YOU KNOW THESE FAMOUS PLANES?



A. The beginning of the American Air Forces! In this plane, in 1909, Orville Wright fulfilled a U. S. Army contract by flying over the Fort Myer parade grounds for 1 hour, 12 minutes and 40 seconds.

B. A 1911 photograph of the first "hydro-aeroplane", developed by Glenn Curtiss, for which he was awarded the Langley medal of the Smithsonian Institution.

C. The "Winnie Mae", piloted by Wiley Post, completed a record globe-circling flight in 1931, traversing 15,474 miles in 8 days, 15 hours and 59 minutes.

D. Traveling at a speed of more than 1,000 miles per hour, the jet propelled D-558-2 Douglas Skyrocket recently surpassed all previous altitude records for any type of aircraft.

AS THE AVIATION INDUSTRY unfolded its wings, another sister industry was developing with it. The story of new airplane designs and new, better, more powerful engines is paralleled by the development of new, improved airplane fuels and lubricants.

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NEWS DIGEST

DOMESTIC

First Martin XB-51 ground support triple-jet bomber has been flown to Edwards AFB, Calif., to undergo additional USAF testing. Plane completed Phase I and II Air Force tests at Martin Airport, Baltimore.

Col. W. J. Worcester, USAF, has been assigned as liaison between military services and Petroleum Administration for Defense on aviation gasoline requirements and procurement.

Northeast Airlines' Convair 240 dropped into the water just short of LaGuardia Field, N. Y., Jan. 14 while making an approach in poor visibility. There were no fatalities among the 33 passengers and crew of 3.

Antonie Strassmann, pioneer German aviatrix, and eastern manager of Zenith Radio's hearing aid division, died in a New York City sanatorium on Jan. 8 at the age of 50. In 1932 she was a crew member of the giant 12-engine Dornier DO-X flying boat when it flew to New York and back to Germany.

Lt. Gen. George E. Stratemeyer, former Far East Air Forces commander, is slated to retire from the USAF Jan. 31 after 36 years of military service. Last May he suffered a heart attack in Tokyo and has been undergoing treatment in Florida.

Three AF generals were nominated to four-star rank by President Truman last week. They are: Lt. Gen. John K. Cannon, Commanding General, TAC; Lt. Gen. Curtis E. LeMay, Commanding General, SAC; Lt. Gen. Benjamin W. Chidlaw, Commanding General, ADC. The President also nominated Lt. Gen. Laurence S. Kuter to be Deputy Chief of Staff of Air Force, Personnel.

Propeller and parts shipments during the first six months of 1951 were valued at $45.7 million, with the military taking 78%. Civilian aircraft props numbered 5,628 valued at $5.1 million.

Small Defense Plants Administration has submitted proposal to Defense Dept. which would spell out price differentials to aid small business firms in getting procurement contracts. SPDA also asks the Comptroller General to rule that advertised procurements need not be given to the lowest bidder, which would permit small businesses to get more contracts.

Clement M. Keys, aviation pioneer who engaged in numerous phases of the industry, including research, air transport, financing of aviation firms, died at the age of 75 in New York City Jan. 12. In 1928 he organized the giant North American Aviation Co. which controlled more than a score of aircraft firms.

Suit was filed by Colonial Airlines in United States District Court, New York, seeking $500,000 in damages from Sigmund Janas, Sr., former Colonial president; Sigmund Janas, Jr., former vice president; Alfred N. Hudson, former vice president; and Monroe Greenthal, Inc., the airline's advertising agency. Cancellation of a stock option agreement with Janas, Sr., is also sought.

FINANCIAL

McDonnell Aircraft Corp., St. Louis, Mo., reports a backlog in excess of $300 million as of Nov. 30, 1951.

Capital Airlines showed a net profit of $1,721,663 for the first 11 months of last year.

Rohr Aircraft Corp., Chula Vista, Calif., has declared a 25-cents-per-share dividend on common stock payable Jan. 25 to holders of record on Jan. 15.

Mid-Continent Airlines reports a $7,729 net profit for last November and a net of $189,956 for the first 11 months of 1951.

Electrol, Inc., Kingston, N. Y., has declared a stock dividend of 4% on outstanding common shares, payable Jan. 30 to holders of record on Jan. 7. Company's backlog is over $12 million.

INTERNATIONAL

KLM Royal Dutch Airlines and Garuda Indonesian Airways (operated under contract to KLM) have jointly ordered 14 Convair-Liner 340s. KLM will operate six of the planes in Europe, and eight in Indonesia for Garuda. Sale brings total of Convair 7..s on order to more than 140.

Aer Lingus DC-3 crashed and burned in Wales Jan. 10, killing all 20 passengers and crew of three. Plane was en route from London to Dublin, hit 3,560-ft. Mt. Snowdon during inclement weather.

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AVIATION CALENDAR

Jan. 21-25—American Institute of Electrical Engineers winter general meeting, Hotel Statler, New York.

Jan. 22—Meeting of Institute of the Aeronautical Sciences, Cleveland-Akron Section; talk, "Freight by Air," by T. L. Grace, president of Slick Airways, Cleveland.

Jan. 22—International Air Transport Assn. Technical Committee meeting, Madrid.

Jan. 22—AIA Engine Technical Committee meeting, Hotel Lexington, New York.

Jan. 23—Institute of the Aeronautical Sciences meeting, Dayton section; presentation on "Titanium—The New Aircraft Metal," by Dr. Heinrich Adenstedt of Wright Air Development Center; 7:30 p.m., Biltmore Hotel, Dayton.

Jan. 28-31—114th National Meeting of the American Meteorological Society, Roosevelt Hotel, New York.

Jan. 28-Feb. 1—20th Annual Meeting, the Institute of the Aeronautical Sciences, Astor Hotel, New York.

Feb. 7—Meeting of Society of Automotive Engineers; Igor I. Sikorsky will speak on helicopter programs; Brass Rail Restaurant, 5 Ave. near 43 St., New York.

Feb. 7-8—Regional meeting of Instrument Society of America, Power Plant Symposium, Hotel Statler, New York.

Feb. 13-15—Area Agricultural Aviation Conference, with unveiling of Ohio Project agricultural plane Feb. 15; headquarters at Seneca Hotel, Columbus, Ohio.

Feb. 14-15—AIA National Aircraft Standards national meeting, Hollywood-Roosevelt Hotel, Los Angeles.

Mar. 3-6—Institute of Radio Engineers, Waldorf-Astoria Hotel & Grand Central Palace, New York.

Mar. 3-7—Spring meeting of American Society for Testing Materials; symposium on testing metal powders and metal powder products; Hotel Statler, Cleveland.

Mar. 14—National Flight Propulsion Meeting, Institute of the Aeronautical Sciences, Cleveland.

Mar. 17-19—Second Midwestern Conference on Fluid Mechanics, to be held at Ohio State University.

Mar. 17-21—American Society of Tool Engineers industrial exposition and annual meeting. Theme: "Tooling for Security." Chicago. (For information, write Denham & Co., 812 Book Building, Detroit.)

Mar. 30-Apr. 3—Convention of American Association of Airport Executives, Ft. Worth.

April 21-24—National Aeronautic Meeting and Aircraft Engineering Display, Society of Automotive Engineers, Hotel Statler, New York.

PICTURE CREDITS

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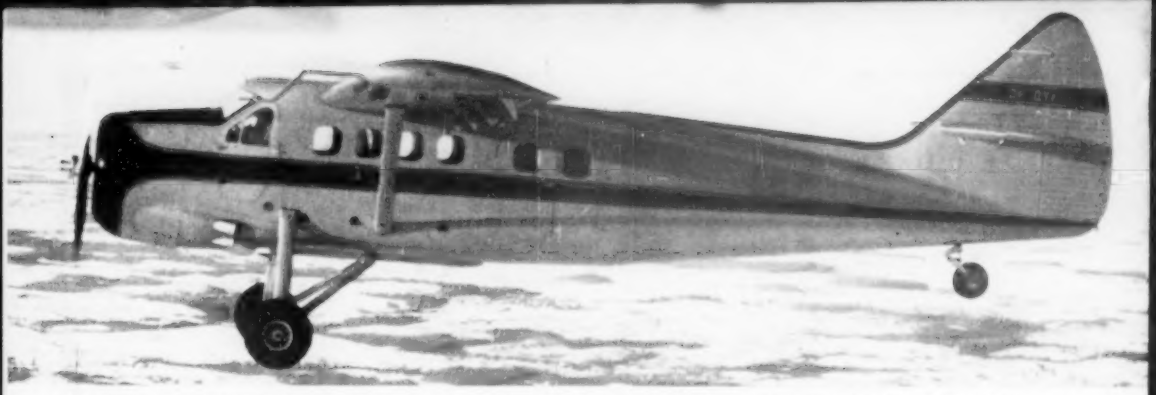
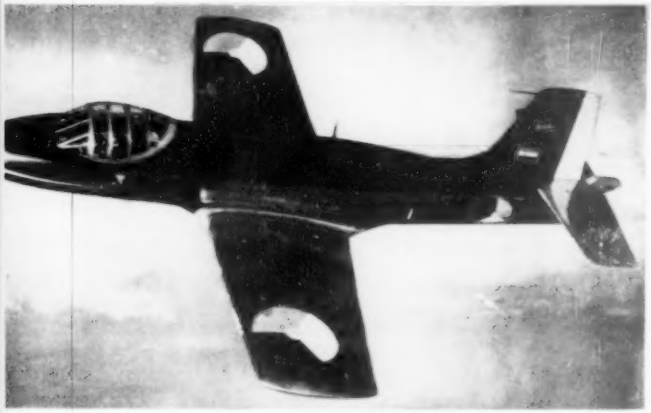


DH-CANADA'S NEW OTTER—Because of its success with Beaver light transport, DH-Canada developed this larger DHC-3 Otter on the Beaver's lines. The Otter has a 600-hp. P&W R-1340, seats 8-14, cruises at 145 mph. and can range 956 nautical miles.

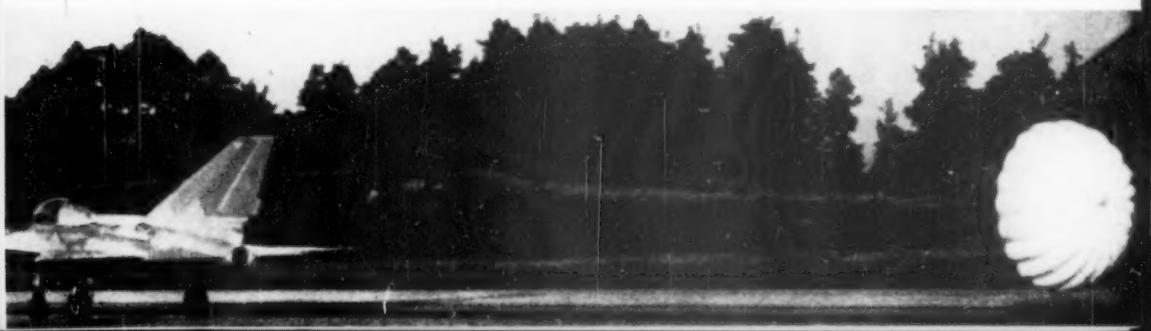


New Foreign Planes Tested

FOKKER'S JET TRAINER—Side-by-side S.14 (left) banks above cloud, showing its wide, roomy cockpit, also broad wing plan. The Rolls-Royce-Derwent-powered trainer will soon undergo evaluation trials by the Dutch Army Air Force. Its 3,600-lb. thrust jet engine gives the S.14 a top speed of 440 mph. at 25,000 ft. It weighs 11,250 lb.

NEW DANISH LIAISON CRAFT—KZ 10 (right) is a two-place army cooperation plane powered by a 145-hp. Continental. Built by Skandinavisk Aero Industri, the KZ 10 weighs 1,900 lb., has a 134-mph. top speed, cruises at 120. It can take off in 410 ft. and land in 165 ft.

SWEDISH DELTA UNVEILED—SAAB 210 (below) brakes its landing roll using the now popular tail chute. The single-seater has dual intakes for its single jet engine. Large cockpit canopy provides fine visibility.



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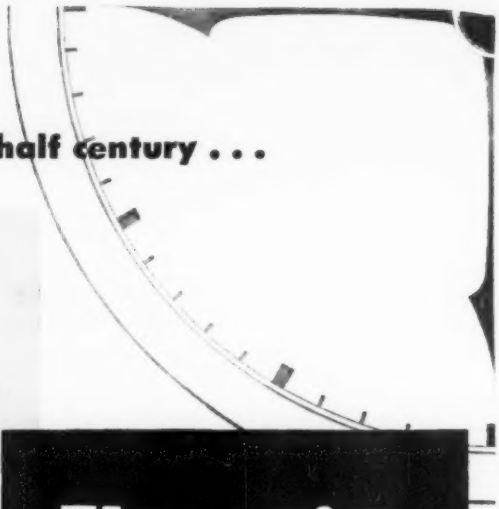

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FLEXON BELLOWS DIVISION

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WHO'S WHERE

In The Front Office

Donald A. Duff, formerly president of Challenger Airlines and recently vice president-traffic and sales of Frontier Airlines, has been elected executive vice president-general manager of Colonial Airlines. Duff has 21 years of air transport experience.

Changes

Robert B. Chapman, III, has been promoted to assistant general manager of Aircraft Armaments, Inc., Baltimore, Md. Other promotions by the firm include **Richard W. Sanford** to chief engineer, **M. J. Frank** to chief manufacturing division, **Joseph P. Paine** to chief project engineer, **D. D. Terwilliger** to chief electro-mechanical engineer and **C. R. Hoskins** to chief administrative division.

Arthur A. Merry, Pratt & Whitney's chief tool engineer since 1940, has been designated chief of advanced tool engineering. **Edward P. Bullard, III**, has been named chief of production engineering. **Leete P. Doty** has been appointed superintendent of P&WA's North Haven branch plant, now nearing completion. **Wildor G. Emond** has been promoted to succeed Doty as superintendent of the Southington plant.

Albert J. Henske heads up a new customer relations and service department set up by Greer Hydraulics, Inc., Brooklyn, N. Y. Henske will work with **Julius Kendall**, general sales and service manager.

Ed Boughton, formerly assistant director of public relations for Trans World Airlines, has been named director of press relations. He will continue to be based in New York. **Tom Bell** becomes assistant to vice president-public relations, will stay in Washington. **George Haithcock** becomes acting public relations manager in Washington. **Walter Menke** has been named administrative assistant to the vice president-public relations in New York.

Charles Hoffhund has been designated assistant work supervisor of Lockheed Aircraft Service, Inc., Burbank.

Milo F. McCammon has returned to Bendix Aviation Corp. to handle manufacturing operations on the staff of the vice president and group executive.

Robert A. Weisse has been appointed assistant sales manager for Kaydon Engineering Corp., Muskegon, Mich., ball and roller bearing maker.

What They're Doing

M. B. (Yank) Spaulding, Jr., recently with the engineering division of Air Transport Assn. of America, has opened offices in Rm. 800, 726 Jackson Place, N.W., Washington 6, D. C. to act as representative before federal government agencies, particularly CAA, CAB, NPA and DPA. From the same office, Morril B. Spaulding, also formerly with ATA's engineering division, will practice law before the federal courts and other government agencies.

INDUSTRY OBSERVER

► **Wright Aeronautical division, Curtiss-Wright Corp., has assembled two J-65 turbojet engines and made delivery of one to Buick Motors division, General Motors, which will be USAF's second source supplier. U. S.-assembled prototype engines were in test in less than 18 months after manufacturing rights for the Sapphire were acquired from Armstrong Siddeley and 11 months after receipt of USAF contract.**

► Tasman Empire Airways, Auckland, N. Z., has ordered a number of Bristol 175 airliners for service between Auckland and Sydney to replace its present equipment, Solent flying boats. The four Proteus turbo-prop-engined aircraft can seat 90 plus crew of five. Company estimates the 175 will reduce flight time between the two terminals from seven to four hours. Deliveries are scheduled to begin early in 1955.

► **A defense production official at Ottawa recently told Canadian newsmen that design engineering and production planning of a "British transonic delta wing fighter" has been under way at the A. V. Roe Canada Ltd. plant for about a year with government funds. However, Avro Canada president Crawford Gordon, Jr. has denied the company is planning production of the Avro 707 delta wing. Three other British delta wing planes in flight test are the Boulton Paul P.111, the Gloster GA5 and the Fairey F.D.1.**

► Chrysler Australia, Ltd., has reached the half-way mark in tooling up for production of the English Electric Canberra jet bomber. The company will manufacture forge-pressed components and subassemblies for the fuselage, wings, tail surfaces, fuel tanks and spare parts for the bomber. Production is scheduled to begin June, 1952. Production of the Australian version of the North American F-86 Sabre has bogged down in the final stages of production planning due to trying to fit the Rolls-Royce Avon to the U. S. airframe. Report from Australia is that engineering studies have determined that final production version will resemble the F-86 in external appearance only. The aircraft also incorporates 20-mm. cannon in place of U. S. .50-cal. machine guns.

► **First two of 12 Lockheed P2V-5 Neptune patrol bombers purchased by the Royal Australian Air Force have been delivered to No. 11 Squadron, Perth, Australia. RAAF crews who took delivery of the aircraft at Lockheed plant have been under instruction in the U. S. at the San Diego Naval Air Station.**

► Rehabilitation of Chevrolet's Tonawanda, N. Y., plant is expected to be completed in six months. Some 550 employes are now installing machine equipment for production of the Wright R-3350 engine. The company will produce parts from its own foundry and forge. Total employment of the Chevrolet Aviation division is expected to total 3,500.

► **Curtiss-Wright Corp. New Metals Processing division, Buffalo, N. Y. will begin production this spring. Although a pilot production line is in operation at the present time, scarcity of machine tools has slowed contemplated production schedule. The company is importing considerable machine tooling from Europe in effort to speed up defense commitments.**

► Fleet Manufacturing Ltd., Ft. Eric, Ont., increased its backlog from $10 to $15 million during the last quarter of 1951. The company is subcontractor to General Electric, Republic Aviation, and de Havilland Aircraft, and to Northern Electric for radio and antennae components.

► **The 40 British Vickers Viscount turboprop airliners on order for British European Airways will use 215-lb. rocket assists for takeoff in tropical climate and high altitudes. The rocket motors use liquid oxygen and a mixture of water and methanol for propellant.**

► Four Bell H-13D helicopters participated in the recently completed atomic tests at Las Vegas, Nev. The copters were used in liaison transport between bomb site and rear headquarters laboratories. The H-13Ds belong to Army's air training school, Ft. Sill, Okla.

Washington Roundup

B-36 Obsolescent?

Congress is cooling on the B-36 and intercontinental bombing, but there's still some strong support for both.

In the early postwar years, Congress was quick to acclaim intercontinental bombing as the atomic "backbone" and "first line" of U. S. defense and offense. Congressmen voted hundreds of millions of dollars more than the Joint Chiefs of Staff asked for a long-range striking air arm.

But now USAF is preparing to ring Russia with air bases. Faster, medium-range jet bombers, with fighter escort, will be able to deliver atomic attack. But so can Navy's carrier aviation.

Here's how key members of Congress feel about the B-36 and intercontinental bombing now:

• **Rep. George Mahon,** chairman of the House Appropriations Subcommittee on the Armed Services, which holds the purse strings for military spending: "We can by no means rely on an intercontinental bombing force. It should be put down as an insurance policy during the postwar years when we didn't have far flung bases and other means for atomic attack. I think we should continue to build some B-36s and B-52s. But there should now be a readjustment—a switch in emphasis to carrier aviation and medium-range bombers."

• **Sen. Joseph O'Mahoney,** chairman of the Senate Appropriations Subcommittee on the Armed Services, with a long record of Air Force support: "I continue to advocate a U. S.-based intercontinental bombing force."

• **Rep. Carl Vinson,** chairman of the House Armed Services Committee, who changed from Navy to Air Force proponent after the war: "I still support an intercontinental bombing force of B-36s or whatever the Air Force thinks it needs."

• **Rep. James Van Zandt,** member of House Armed Services Committee: "The B-36 is rapidly becoming obsolete. It's too slow and too clumsy. The day is approaching when it will be used as a cargo carrier and tanker for fueling. The lighter and faster B-52, which won't have the B-36's intercontinental range, is going to be the backbone of our strategic air arm."

• **Sen. Burnet Maybank,** member of Senate Appropriations Committee, supporter of the controversial 70-group USAF a few years back, and author of last year's amendment to the military budget adding $5 billion additional for air power (later reduced to $1 billion): "There's no longer the need for the vast emphasis on long-range strategic air. I am absolutely in favor of building up carrier aviation."

• **Sen. William Knowland,** member of Senate Appropriations and Armed Services Committees: "There is still a need for an intercontinental bombing force."

• **Sen. Homer Ferguson,** Senate Appropriations Committee member: "I want to keep up an intercontinental bombing force. We don't have our overseas bases yet, and we're running into difficulties getting them. We don't know what strings will be attached. For example, we can't launch an atomic attack with our planes based in England, without England's consent."

Battle of Tactical Air

There's a drive on in Congress to strip the Air Force of tactical air control, limiting USAF's offensive role to strategic air.

Expect speeches on the floor of the House before long, denouncing USAF's direction of tactical air in Korea.

Their purpose: to force reluctant Chairman Carl Vinson of House Armed Services Committee to open hearings that will serve as a springboard for legislation lodging the tactical air role with Army and Navy only.

One sensational speech made by Rep. James Van Zandt, Naval Reserve captain, forced a reluctant Vinson to air the inter-service controversy over the B-36 a few years ago.

If speeches don't avail, members of the House Appropriations Committee may go into the tactical air controversy—encroaching on the territory of Armed Services Committee, which Vinson so zealously guards.

Distinction for a Nonsked

CAB Chairman Donald Nyrop's New Year's Day trip to Little Valley, N. Y., for an on-the-spot inspection of the crashed C-46 plane of Continental Charters, a nonsked, set a "first" in Civil Aeronautics Board history, according to CAB. It was the first time in CAB's 14-year life that a Chairman has visited the scene of a crash, according to the Board.

Nonskeds didn't like the publicity from the visit.

Details on Nyrop's inspection:

• The Board Chairman took off from Washington in CAB's DC-3 executive plane at 8 a.m. New Year's Day with two accident investigators, a Civil Aeronautics Administration photographer, CAB's public relations officer, and two reporters. Other reporters from the Washington area had been invited, but declined.

• He spent a half hour at the scene of the crash, including talking with newsmen and posing for pictures.

• The next three hours were devoted to a press conference in preparation and presentation of a radio interview on the C-46 crash. For this, Nyrop passed up a planned trip to a nearby hospital to talk with and obtain information on the crash from its 14 survivors.

• Then Nyrop cuplined for home.

What's Ahead in Congress

• **Marine Air Strength.** House Armed Services Committeemen are trying to push legislation requiring a Marine Corps strength of four air wings through Rules Committee for action on the House floor—but it's questionable they'll succeed. Joint Chiefs of Staff have approved a target of only three.

Major controversy over the measure: It makes the Marine commandant a member of the Joint Chiefs of Staff. Army and Air Force generally siding together, now overrule Navy in the top military command. This would end the unbalance.

• **New Feeder Plane.** Local service lines are hopeful House Interstate and Foreign Commerce Committee will start the ball rolling for an $8-million government outlay for development of a plane suited to their service. With a Budget Bureau veto, it isn't likely to go far.

• **International Travel.** Measure streamlining immigration and customs laws to stimulate international travel are set to go through Congress soon. Committee ground work has been completed.

• **Civilian flight schools** will benefit from ROTC legislation that will be passed this session. The services would be able to contract with the schools for flight training. But there's no hope on the horizon for civilian aviation mechanic schools.

—Katherine Johnsen

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Defense Heads Set Back Plane Production

- **Aircraft manufacturing program to take an extra year, although eventual totals will be the same.**
- **B-47, F-89, C-119 and trainer programs affected heavily through new limits on monthly output.**
- **Schedule pushback announced by Pentagon blamed on low powerplant production; engine makers hit.**

By Aviation Week's Washington Staff

Top government defense planners took a gamble on the urgency of U. S. military preparedness last week and applied the stretch-out treatment to U. S. military aircraft production schedules.

Defense Secretary Robert Lovett, Defense Mobilizer Charles E. Wilson and their subordinates are putting their blue chips on a calculated risk that Soviet Russia isn't as bellicose towards the free nations as she was, and that chances for World War III are now less than they were a year ago.

They still want the same number of airplanes, a 143-wing Air Force and 15 Navy air carrier groups and 49 additional Navy squadrons, but they are willing to wait a year longer, until mid-1955 to get the full strength realized.

Low engine production is cited as the principal reason for the stretch-out of schedules. There are not enough machine tools and materials to reach the peaks set by previous schedules, so the services expect to get the same number of engines in a production period a year longer.

▶ **The Word Goes Out**—In Pentagon conference rooms last week Air Force Undersecretary Roswell L. Gilpatric, Navy Assistant Secretary John F. Floberg and other procurement planners gave the word to most of the U. S. aircraft powerplant and accessory manufacturers—called in to hear it.

Stripped of Pentagon terminology, here is what the new arrangement will mean:

- Some peak levels of aircraft production are drastically lowered, in some cases as much as 50%. And the reduction in peak production will be cut out of the aircraft company schedules rather than from the second source producers, mainly the U. S. automobile companies.
- The lower peak levels of monthly production which are now being set will continue longer, until essentially the same number of airplanes are built.
- The stretch-out will apply to engine production as well as airframes. For example, one auto plant in the Detroit area (Packard) will have its jet engine peak production level reduced about 40%, and similar peak reductions are due for General Electric, Westinghouse, and the old-line aircraft engine companies, and the other auto engine producers.
- If small business is not to get the effect of the rollback schedules in subcontract rollbacks and cancelation of some third- and fourth-source subcontracts, it will mean that the airframe and engine prime producers will have a big inventory of components ready for use a year before they are needed. Defense officials had not exactly explained how this problem would be met.
- On the whole, Navy aircraft contractors come out of the new shuffle better than Air Force contractors, but they had less to lose at the very outset.
- Biggest effect of the schedule push back is in trainers and transport aircraft. But there is hardly a plane for which 1953 procurement funds were to be used that is not affected.

▶ **Fairchild**—Heavily affected by a new schedule revision is Fairchild Engine and Airplane Corp. which received notification that the Air Force had canceled its Chicago program to build the C-119 transport at the wooden Park Ridge government-owned defense plant, occupied by Douglas in World War II.

Fairchild will continue in production on the airplane at its smaller Hagerstown, Md., parent plant, which is now being expanded to permit virtual doubling of the present production rate. But the maximum Hagerstown rate will not approach what could be done in the giant Chicago plant.

Air Force and Navy sources, however, explained that the C-119 cutback was not due to the budget restrictions which caused the general schedule stretchout. It principally reflects a cutback in requirements for the NATO group of European nations under the Mutual Defense Assistance Program, some industry sources said.

Fairchild is now trying to make other employment arrangements for some 800 employes already at work in the Chicago plant.

▶ **Kaiser-Frazer**—If Kaiser-Frazer Corp. gets a cutback on its schedule to build the same airplane at Willow Run, Mich., look for a second Detroit labor

But on the Other Hand . . .

While defense planners gave a healthy push back last week to military aircraft schedules, the Administration in Washington was talking up rearmament just about at the same time:

▶ **Secretary of Defense Robert Lovett** deplored lagging aircraft and tank production in testimony to the Senate Armed Services Committee. His comment: "We are behind in production schedules and it will take us a long time to catch up."

▶ **President Truman's** State of the Union message to the Congress called for all-out defense effort, with emphasis on air power. Excerpts:

- "This year, 1952, is a crucial year in the defense effort of the whole free world. If we falter, we can lose all the gains that we have made."
- "The grim fact remains that the Soviet Union is increasing its armed might. It is still producing more war planes than the free nations."
- "In Europe, we must go on helping our friends and allies to build up their military forces. This means we must send weapons in large volume to our European allies."
- "I shall recommend some increases in the size of the active force we are building, with particular emphasis on air power."

pilgrimage to Washington. Some industry sources thought that the heavy clamor raised by Detroit industry and labor groups in Washington about growing unemployment in Detroit would save the KE airframe programs from the pushback.

Michigan Senator Blair Moody quoted President Edgar Kaiser as saying his Willow Run plant could employ 15,000 more aircraft workers if they had the orders. Current Willow Run employment is reportedly about 20,000, partly on aircraft and partly on auto production.

The first Willow Run-assembled C-119 is expected to fly in March. It is the only airframe contract now in production in the Detroit area, except a Hudson program in very early stages to build sub-assemblies for the B-47 bomber.

▶ **Trainees**—In the training field, several manufacturers feel the blow of lower scheduling. Beech Aircraft Co. is probably hardest hit with its newly won T-36 production contract pushed back to a low production peak level about half of what had been scheduled earlier.

Delivery schedules for Convair's T-29 navigation trainer program are less seriously cut, with planned peak deliveries lowered only one plane a month.

North American Aviation's T-28 trainer also got a push back of undisclosed proportions on its monthly peak production rate.

▶ **B-47, Fighters**—Even USAF's top-priority B-47 bomber program was not exempted. The B-47 scheduling cutback will be taken out of the Boeing Wichita program, and will not affect the Douglas-Tulsa and Lockheed Marietta B-47 licensee plans, contrary to earlier reports.

Among fighters, Northrop Aircraft took a sharp cut in the peak delivery schedule planned for its two-place Scorpion F-89 night fighter, with a result that the peak monthly schedules will be approximately 40% lower than the peak previously planned.

North American's F-86 Sabre jet fighter, it is understood, is not materially affected by the cutback.

It is understood that there is no revision in other bomber schedules, except for the B-47 changes.

▶ **Engine Builders**—Prime effort during calendar 1953 will be made by the Air Force to jack up engine manufacturers first, the electronics manufacturers second, AVIATION WEEK was told by military sources. While both are essential, the engine builders—both prime contractors and second source suppliers—are behind in programmed commitments. Both USAF and Navy remain hopeful that the electronics, in quantity and in quality, will be available when needed.

Actually what is being attempted is a final revision of airframe delivery schedules to meet realistically the capabilities of the engine manufacturers and electronics builders. A top Navy source explained that complexity of the modern combat aircraft has caused a complete revision of procurement planning.

The airframe, which used to be given top consideration in production planning has evolved to a streamlined "box" to carry a multitude of complex gadgets—electronics, weapons, computers, etc.—now are of first magnitude in production planning.

▶ **AF Hard Hit**—Generally, Navy air procurement and production programming suffer little in comparison to that of USAF. Reasons cited were that Navy programming had been figured more conservatively because of "a more restrictive air role" and because of minimum demands which have been made upon its suppliers.

Air Force, on the other hand, is particularly hard hit because of the diversity of its roles and missions. Again, while emphasis is on reaching a lower peak level because of budget curtailment and stretching out deliveries of complete aircraft through projection of the in-being 143 wings to 1955, USAF insists that overall planned procurement remains firm.

The Air Force said that, as a result of contemplated schedules, it "will not modernize the transport wings as rapidly as had been previously planned." This will have a material effect on Army which has been planning rapid conversion of many of its ground units to airborne pattern.

▶ **Navy Plans**—Navy declares its planned procurement of transports from fiscal 1953 funds is zero. It was explained, however, that deliveries of transport aircraft ordered from fiscal 1950 and '51 funds will continue through calendar 1952. These are without change.

Navy sources point out that Naval air strength has just about increased to the strength it comprised during its post-war peak year 1947. Navy air strength will reach projected peak of some 15 air carrier groups, 49 patrol and anti-submarine squadrons plus approximately 30 Marine air squadrons in 1955 instead of by mid 1954.

Overall Naval air production roll back and contemplated procurement from fiscal 1953 results in a net downward revision of approximately 10% over previous programming. Slowdown in deliveries as a result of the rescheduling is expected to hit Navy schedules during fiscal 1953, in the last quarter of calendar year 1952. Overall effect on deliveries of complete aircraft will result in a level out early in calendar 1953, with production level stabilized in mid-1953.

Currently programmed procurement and production of Naval training aircraft similarly remains unchanged due to the fact that most pilot trainers used by that service are "holdovers" from World War II with the exception of helicopter trainers. For the most part, procurement current and projected is unchanged as the number on order is small plus the fact that the helicopters are actually multi-purpose for missions "other than training."

Industry Services Talk Patent Rights

Aviation manufacturers once again are trying to pin the Defense Department down to consistent recognition of proprietary rights in development and procurement contracts.

For the first time in more than ten years, representatives of industry and the services met last week to study the present policy on rights of inventors, whether companies or individuals, in developments financed wholly or partly with government funds.

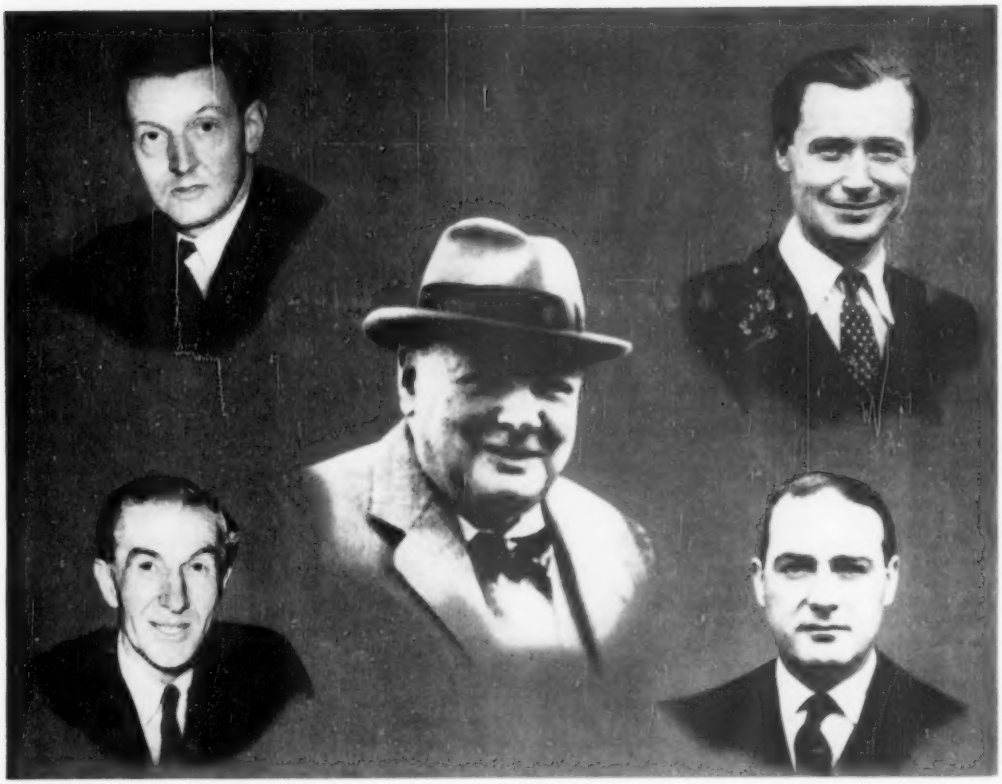
On the government side was the Patent Policy and Review Board of the Defense Department, chairmanned by Rear Adm. C. M. Bolster, Chief of the Office of Naval Research, and consisting of the judge advocates general of the Army and Air Force.

▶ **Value of Licenses**—The subject discussed last week arises from the fact that all developments stemming from federally financed research are available royalty-free to the government. But the services and industry sometimes disagree on whether royalties should be paid to the developing company by other firms licensed to use the development at the request of the armed services.

This question has become increasingly important to foreign firms, some of which feel they have not been granted proper recognition by the services in the matter of proprietary rights. Some observers feel that more foreign firms should be encouraged to "export their brains" to this country, and that one major step would be better treatment in the matter of proprietary rights.

▶ **Okay in Principle**—Generally speaking, the military concedes the principle of proprietary rights as far as developments by U. S. manufacturers are concerned. But the principle tends to become fuzzy without occasional review.

The last broad discussion of the subject was in 1939, with the exception of testimony offered to the President's Air Policy Commission in 1947. Some months ago the industry presented its views to the Air Force, and appointment of Adm. Bolster's board was the result.



BRITISH LEADERS whose voices will be heard on aviation matters in the Tory government of Prime Minister Winston Churchill (center) are: Lord de L'Isle and Dudley (top left), Secretary of State for Air; Duncan Sandys (top right), Minister of Supply; John Scott Maclay (lower left), Minister of Transport and Civil Aviation, and Air Commodore A. V. Harvey (lower right), Tory aviation spokesman.

Men Around Churchill Push Air Power

By Nat McKitterick
(*McGraw-Hill World News*)

London—"It is perfectly clear," Winston Churchill said in the defense debate last December, "that in the sphere of material needs, the claims of the Royal Air Force must have first and special emphasis and priority."

These were comforting words to Britain's eager but ill-supplied aircraft manufacturers. Said the Society of British Aircraft Constructors in a year-end statement, "1952 must be a year of rapid expansion, bringing more men, more materials, more tools into the industry."

▶ **Priorities Are Many**—But only hard, politically unpopular administrative decisions by the highest government officials are going to make this possible. "First priorities" in Britain today are as common as London fogs.

The air mindedness of Churchill and his cabinet must be severely tempered by the tougher-than-ever jobs of finding the exports on which Britain lives, the needs for rearmament in other fields, the basic minimum of new capital to keep British industry at all competitive, and the basic minimum for social services to keep the Tories in office.

Churchill himself is both the strongest and the weakest link in the Tory air cabinet. He lacks no knowledge or appreciation of the primacy of air-power. But his insistence on his war-time dual role of Prime Minister and Defense Minister, against mounting criticism within his party, is slowing matters up. What is needed is a full-time defense minister with broad powers over production.

▶ **Candidates**—Such an appointment has been rumored almost weekly since the election. And chances are, shortly after his return from Washington, Churchill will take some action in this direction. Two cabinet officers have been most regularly mooted for the post: Oliver Lyttelton, Colonial Minister, who was Minister of Defense Production during the war, and Lord Ismay, Minister for Commonwealth Relations, who was Churchill's deputy Defense Minister during the war.

Lyttelton, a tough businessman who stepped down as chairman of one of Britain's leading electrical manufacturing firms last October, was reported to have been offered his war-time job back after the election, but refused, so the report goes, on the grounds that he would not have authority to direct labor into defense industries.

With a man like either Lyttelton or Lord Ismay grappling with the all-important production problem, Churchill will have a strong air cabinet, albeit all the minor ministers are newcomers to aviation.

At the Air Ministry, the capable and

popular Lord de L'Isle and Dudley is in charge. A Victoria Cross winner as a Grenadier Guards Officer at Anzio in World War II, Lord de L'Isle and Dudley has a solid political background. He was parliamentary secretary to the Ministry of Food and then to the Ministry of Pensions in 1945 before he was elevated to the peerage on the death of his father in that year.

▶ **Swinton's Role**—To guide him in aviation matters, he will have the advice of Britain's First Secretary for Air, Lord Swinton, who is Churchill's Chancellor of the Duchy of Lancaster (an honorary, advisory post). It was Lord Swinton who, before the last war, made the all-important decisions to order the Spitfire and the Hurricane off the drawing boards, to push the development of radar, and to decentralize aircraft production through a system of shadow factories.

Lord de L'Isle and Dudley has been quick to pick up the cudgels for the aircraft industry. "Air power in all its forms is one of our strongest assets in peace or war," he said in his first post-election speech.

Speaking at about the same time, his Vice Chief of Air Staff, Sir Ralph Cochrane, said, "We built up our sea power on ships, built in this country for owners all over the world as well as for our own trade, and this had a great effect on our life as a sea-faring nation. The air must do the same, and I see no reason why it should not."

▶ **Not Optimistic**—Lord de L'Isle and Dudley isn't all optimism, though. Praising the new Hawker P. 1067 jet fighter, he said, "I must speak frankly . . . it will be a considerable time before this new fighter comes into service in RAF squadrons. In the meantime, we must continue to produce aircraft such as the Meteor."

Watching over civil aviation matters are two former shipowners: Minister of Transport and Civil Aviation John S. Maclay and Lord Leathers, who, as one of Churchill's "overlords," has a high policy assignment to coordinate all ministries of transport, fuel, and power.

Maclay was parliamentary secretary to the Minister of Production in Churchill's postwar "caretaker" government; Lord Leathers was wartime Minister of Transport. Between the two, the fate of the Ministry of Civil Aviation will be decided. It is a foregone conclusion from Maclay's title that MCA will disappear into the Ministry of Transport.

▶ **Undertake Study**—Lord Leathers, in a debate in the House of Lords, has had the only say on civil aviation policy so far: "We favor a combination of public and private enterprise in whatver way is in the best interests of British civil aviation." Just what that means will have to await the outcome of a year-long study just initiated by Lord Leathers' department.

He assured the house, however, that he had no intention of undermining BEA's and BOAC's existing international networks, which seems to indicate that most of the concessions to private enterprise will come in the charter field.

All orders to the aircraft industry for production or research go out through the Ministry of Supply. Here Churchill has installed his son-in-law, Duncan Sandys, who was Minister of Works in the 1944-45 government. Sandys has yet to express himself on aircraft production, though he has been visiting plants to size the problem up. He has been made responsible for one of the most controversial political commitments of the Tory government, denationalization of steel, which is providing him with plenty of distractions.

Labor is vowing to renationalize any private steel body the Tories set up, if they get back into power. Trying to get private investors to return under that threat is giving Mr. Sandys many sleepless nights.

Although Air Commodore A. V. Harvey is not expected to give up the directorship he holds at Handley Page to take over a post in the Churchill cabinet, he nevertheless will continue to be a chief spokesman for the Tories in aviation matters.

Gratuities Trials Open at Dayton

Dayton—The first "gratuities" trial involving indictments for alleged Air Force procurement irregularities began in Federal Court here with the government seeking to show that there had been a pattern of "gifts-then-contracts."

Defendant Lawrence A. Razete, official of Cincinnati Electronics, Inc., and Raytronics Laboratories, Inc., both of Cincinnati, was indicted on four counts. He was charged with giving Luther M. Kratz, former contracting officer in the Procurement division of Wright-Patterson AFB, gifts amounting to $900 in cash and a radio set. Both were indicted on a fifth count charging conspiracy to defraud the government.

Kratz pleaded guilty to all five counts. At opening of the trial, he described in detail the various times he received cash gifts. He told jurors that two of the gifts, one $500 and one for $200, were given him by Razete within the confines of the Air Force base. The other $200 was given him while driving in Razete's car en route to a downtown Dayton restaurant.

▶ **Other Gifts**—He also testified that he purchased a radio for $200, paid for it by personal check, and that an agent of Razete's later refunded him cash in the full amount.

Kratz previously testified that, "on Aug. 4, 1950, he (Razete) said I would be rewarded later for the help I had given him in getting things started."

"Things" involve contracts approximating $1.5 million awarded the Colonial Radio Co. for junction boxes and

CONVAIR'S PRESSURIZED CLASSROOM

USAF is taking delivery on the new Convair T-29B navigator-bombardier trainer, which differs from the earlier T-29A in having cabin pressurization and air conditioning systems similar to the civil Convair-Liner. T-29B gross weight has gone up to 43,575 lb., compared with the T-29A's 40,500. Distinguishing exterior features of the T-29B are its three astrodomes and periscopic sextant atop fuselage—the T-29A has four astrodomes. USAF delivered its first new T-29B to Mather AFB, Sacramento.

$1.1 million to the Cincinnati Raytronics Co. for radio receivers.

▶ **The Penalty**—Conviction on each of the four respective individual indictments carries a penalty up to three years' imprisonment and $10,000 fine or both, while conviction on the conspiracy indictment could be five years' imprisonment and a $10,000 fine or both.

Three alternates supplement the jury composed of six men and six women. It was indicated the trial would take two weeks because of the large number of witnesses to testify.

Operators Ask New Laws for Copters

Plans to draft standard legislation for presentation to city and county governments in an attempt to free helicopters from local restrictions designed for fixed-wing aircraft were agreed on at the first annual meeting of the Helicopter Assn. of America in San Francisco Jan. 11-12.

The HAA was promised the cooperation of the California Aeronautics Commission in drawing up proposed legislative measures to "let the helicopter into the cities and towns."

▶ **Name Officers**—Elmer Schlesinger, president of Helicopter Services of California, was re-elected president of the organization. Carl Brady, of Economy Pest Control, Yakima, Wash., was chosen secretary, and Roy Falconer, Rotor Aids, Ventura, Calif., treasurer.

The meeting actually was the third annual convention for the group, which formerly met under the name of the California Helicopter Assn. It invited nationwide membership in January of last year, when it adopted the new name. It is still primarily composed of West Coast helicopter operators.

Schlesinger estimated that the 60 who attended the sessions represented 70% of the operators in the new industry.

▶ **Panel Discussions**—Harvey Gaylord, vice president of Bell Aircraft Corp., spoke at the meeting, predicting that the present critical situation in helicopter parts would ease in March, when he thought pipelines would begin to fill.

Panel discussions were led by Robert Lacer, general manager, Kern Copters; Art Fornoff, Western division manager, Bell Aircraft Supply Corp.; James S. Ricklefs, president of Rick Helicopters, and Knute Flint, president of AT Helicopters.

Mechanics Shortage Forecast by ATS

Likelihood of a critical shortage of mechanics and other technicians for the 143-wing Air Force and for the enlarged manufacturing and airline programs is worrying officials of the armed services and industry.

A sharp drop in enrollments in technical schools has created the possibility of the shortage. To study proposed remedies, the Aeronautical Training Society has called a two-day Washington conference the end of this week among representatives of the services, airlines, manufacturers and training schools.

▶ **Due to Draft**—While the armed services have most to lose if the supply of mechanics and technicians dries up, the present needs of the services are one of the major reasons for the looming shortage. Most of the students in airplane and engine mechanics courses are veterans. Calling up of reservists has pulled many of them out of school.

In addition, Selective Service has caught many of the non-veterans who ordinarily would be expected to enroll in A&E mechanic's courses and aeronautical engineering courses in non-degree granting schools.

A third factor contributing to the drop in enrollment is the expiration last summer of the period in which a veteran could obtain government aid to education.

▶ **Vanishing Students**—In calling the conference Jan. 24-25 at the Mayflower Hotel in Washington, ATS cited these figures to show what's happening in aviation technical education:

Enrollment in A&E mechanic's courses in October, 1949 was 7,363; in 1950 it was 5,692. By last October it was down to about 4,800.

Enrollment in aeronautical engineering courses of below college level was 841 in October, 1949; in 1950 it was 720. Last October, it was about 600.

Of 121 approved technical schools as of Jan. 19, 1951, nine have closed, including some of the largest.

Within one year, ATS says, two-thirds of the A&E schools will be out of business if a way out of the present situation is not found soon.

Here's the solution that will be proposed at ATS, with the Aircraft Industries Assn. and the Air Transport Assn. cooperating:

- **Contract training** programs on behalf of both the services and industry.
- **Amendment of Selective Service Act** to give students in technical schools right of delayed induction.
- **A veterans' education plan** for veterans of the Korean war.

BELL X-5 TRIES ITS WINGS

The Bell X-5 research plane is shown in flight with its wings in the swept position during a flight test from Edwards AFB, Calif. The novel single-seater features wing sweep which can be varied by the pilot to suit various conditions, such as takeoff, high speed flight and landing. Data obtained from these tests will be utilized in design of several upcoming military combat planes which will include similar principles. The little plane (span 32 ft. 9 in., gross weight about five tons) is powered by an Allison J-35-A-17 engine which is located in the fuselage belly, giving 4,900 lb. thrust at sea level.

FINANCIAL

Relative Market Action

Listed Aircraft Common Stocks

COMPANY	1946 HIGH	DEC. 31, 1949 CLOSE	DEC. 31, 1950 CLOSE	DEC. 31, 1951 CLOSE	% CHANGE FROM 12 31 50 TO 12 31 51
Beech*	16	7¾	12⅝	12¾	1.0%
Bell	36	12½	26⅝	34	27.7
Boeing	35	23⅛	41	44¾	9.1
Convair	34	10¾	17¾	17¼	− 2.8
Curtiss-Wright	12	7½	11¾	9¼	−21.3
Douglas*	55	36¼	47⅜	57⅝	20.6
Fairchild Engine	8	4⅞	8⅝	7⅛	−17.4
Grumman*	13	9⅝	26¾	23½	−10.9
Lockheed*	23	22½	19	22⅛	16.4
Martin	46	10⅝	20⅛	12¼	−39.9
No. American	17	11⅜	17⅛	15⅝	−10.1
Northrop	15	6⅝	13⅛	14¾	10.3
Republic	25	6	16⅛	13⅞	−14.0
United Aircraft*	30	21¼	28⅜	31⅝	11.1

** Adjusted for all stock split-ups. No adjustments made for cash dividends. All fractions omitted for 1946.*

Backlogs No Guarantee of Profits

- **Stocks of many leading aircraft manufacturers were down in 1951, despite huge military expenditures.**
- **Inflated expectations collapsed as volume production and deliveries failed to materialize.**

Aircraft equities experienced sharply mixed market tendencies last year. Despite rising enthusiasm early in 1951 as a result of increased military appropriations, disappointment in the progress of many aircraft companies was reflected in lower market prices as 1951 came to a close.

▶**History Repeats**—Recent experiences merely repeat the historical pattern of military aircraft procurement and attendant market reflections. Major bursts of strength in price for aircraft equities invariably accompany the anticipation or actual announcement of orders. However, as pointed out here more than a year ago (AVIATION WEEK Dec. 18, 1950), "Remaining unanswered is how soon can the separate companies attain volume production levels and, most important of all to the investor, what will such results mean when translated to available earnings."

As it became apparent that bulging backlogs were no guarantee of immediate heavy deliveries and higher earnings, inflated market expectations in many instances were soon deflated.

The accompanying table reveals the relative market action of the major listed aircraft producers. Of the 14 equities tested, eight showed varying declines at the 1951 year-end compared with Dec. 31, 1950. On the other hand, six issues showed a wide range of gains during the same period.

For comparative purposes, the 1946 highs generally representing the postwar peaks, are also shown with 1949 year-end closing prices, when most aircraft issues were at depressed levels.

▶**Declines**—The largest market decline was recorded by the common stock of the Glenn L. Martin Co. This equity was down 39.9% from the 1950 year-end. This action is nothing more than a reflection of the financial difficulties which were recently experienced by the company.

Also showing declines were Curtiss-Wright, Fairchild Engine, Republic, Grumman, North American, Convair and Beech. In most instances if not all, lower earnings are anticipated for 1951 as contrasted with 1950.

▶**Improved Performances**—The best market performance of 1951 belongs to Bell Aircraft. This equity showed a market appreciation of 27.7% during the year. Its 1951 year-end closing price was almost three times that recorded Dec. 31, 1949, and closely approached the levels experienced at the 1946 peak.

The improving earnings of the company, together with its prominence in the helicopter field, are responsible for this excellent market showing. The company has also announced plans to split its stock, two shares for one.

Douglas Aircraft also did well for its market adherents last year. A gain of 20.6% was established at Dec. 31, 1951, over the 1950 year-end. Further, the equity surpassed its previous peak market price of 1946. While earnings and outlook formed the basis of this showing, it took a stock dividend to develop real market interest of a broader nature in this equity.

▶**Stock Dividends**—Stock dividends figured prominently in the aircraft group last year. In addition to those already indicated, Lockheed effected a two for one split in July, 1951, and United Aircraft Corp. declared a 20% stock dividend on its junior equity. In all instances where stock dividend action was taken rising earnings served as a proper underpinning.

Stock dividends in themselves create no additional values. The equity interest in the security remains the same. But it does serve to broaden ownership in a company while effectively dramatizing progress being made. It serves also as a means of providing a new base for increased cash dividends.

It will be noted that, in addition to Bell and Douglas, other issues have almost equaled or surpassed their 1946 peaks. These include Boeing, Grumman, Northrop, United Aircraft and North American. Still far removed from the best prices of 1946 are the equities of Convair and Republic, along with Martin.

Grumman was down at the 1951 year-end from its 1950 closing price by 10.9%. However, this equity was the best market performer in the aircraft group during 1950. The company had declared two separate 100% stock dividends in recent years.

Once again the market experience of the aircraft group has demonstrated their complete lack of uniformity.

These mixed tendencies were more pronounced than ever during 1951. There was no uniform trend, the issues that moved up did so over a wide percentage range. In the group that declined, the variations were equally wide. Subsequent recoveries, where present, assumed no consistent pattern in retracing the path to 1946 peaks.

Selectivity, always present in the aircraft group, will become even more so during the coming year. As the individual companies produce and establish their ability to develop earning power, so will market evaluations be made of their separate equities.

—Selig Altschul

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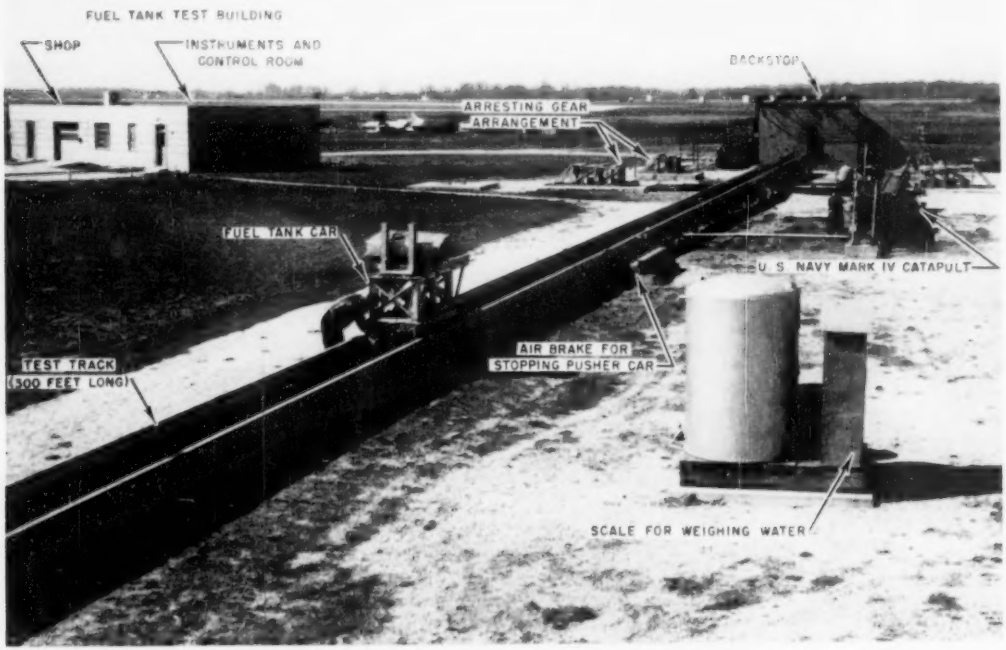


HERE IS WHERE CAA carries out crash tests of aircraft fuel tanks at its Technical Development and Evaluation Center.

CAA Crash Studies Give New Safety Data

CAUGHT IN THE IMPACT, integral tank hurtles from launcher into backstop.

● Fire is known to be a major killer in crashes.

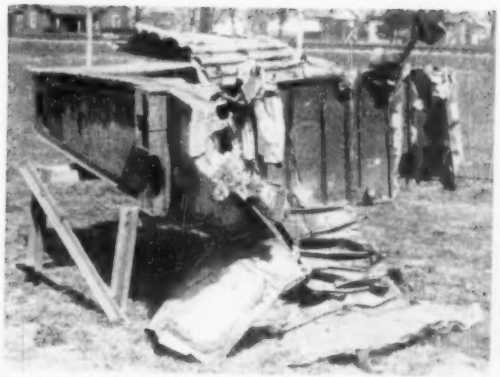
● Now tests show how to cut down this fire danger.

The high toll that fire takes in survivable plane crashes has led to intensive studies giving new safety data to aircraft designers.

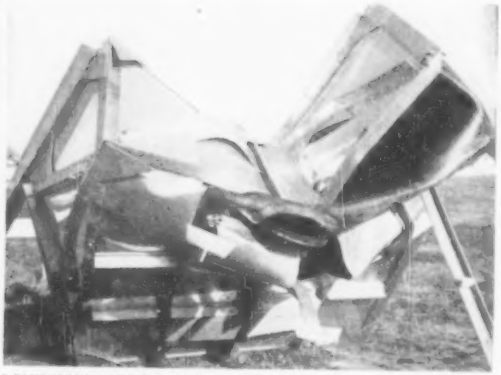
Statistics on domestic and international scheduled passenger air carrier operation from January, 1938, through June, 1951 indicate this toll.

- **Crashes not followed by fire** were fatal to 60.8% of the occupants.
- **Crashes followed by fire** jumped the fatality rate to 84.6%.
- **This indicates** that the difference—23.8%—was caused by fire, CAA says.

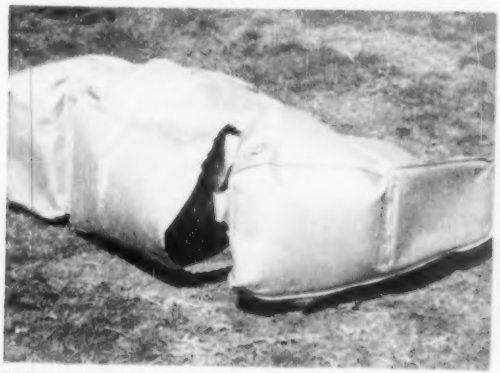
►**CAA Study**—Answers to crash-fire problems are being ferreted out by the Civil Aeronautics Administration in a comprehensive testing program at its Technical Development and Evaluation



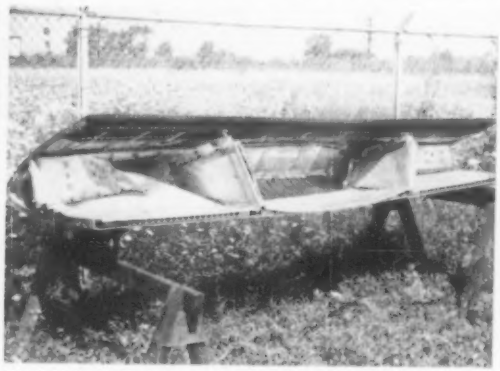
INTEGRAL TANK after impact shows explosive effect of crash.



ENCLOSED SELF-SEALING tank after impact against column.



SOFT ALUMINUM SHELL tank ruptured in deceleration test.



BLADDER CELL tank deceleration test causes bulkhead failures.

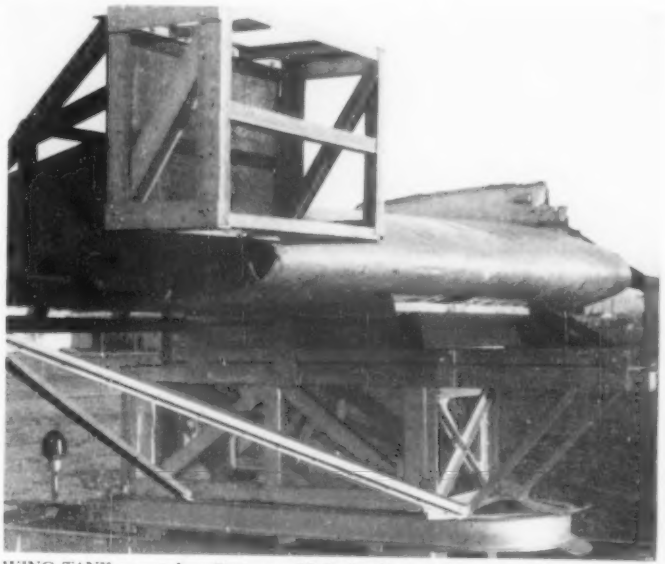
Center at Indianapolis. A key part of this study is aimed at the development of aircraft fuel tanks possessing a greater degree of rupture-resistance than existing tanks.

What CAA has found in its investigations was revealed by Robert Schroers, chief of the agency's structures branch, aircraft division, in a paper delivered at the recent Society of Automotive Engineers National Aeronautic Meeting in Los Angeles.

► **Tank Strength**—An initial consideration in CAA's planning was to determine how strong a crash-resistant tank should be. There was no reliable basis from which to formulate an answer to this poser, but it was obvious that it would be unreasonable to attempt prevention of tank rupture in those crashes where severity of the impact left no chance for personnel survival.

This meant that the program should be directed at the development of fuel tanks to resist rupture only under moderately severe crash conditions.

Safety belts and supporting structure were considered capable of restraining personnel up to 10Gs. But it was be-



WING TANK mounted on "torture rack" for bending and torsion, or deformation, test.

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HAYDON manufactures a wide range of dependable timing motors notable for their small size; quiet operation; total enclosure; separate systems for controlled lubrication of rotor and gear train; ability to operate in any position. Standard speed range from 60 rpm to one revolution in 7 days. The HAYDON motor is the basic element for standard timing components and custom-engineered timers designed and manufactured by the company for volume applications.

DESIGN INFORMATION

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believed that when cabin structure is subjected to forces of such value, the wings frequently are subjected to much greater loads—possibly 30Gs, or higher, and tanks to take this 30G load were considered impossible to attain or at least impractical.

► **20G Tank**—A 20G tank initially was set up as the goal, but it is now believed that the results of the studies should lead to tank configurations to withstand a range of forces on either side of the 20G value.

CAA's investigations covered a study of existing accident data; special studies of accidents as they occur, to determine nature and extent of damage to tanks during actual crash conditions, and a test program on many types of tanks and supporting structures to check on tank strength and how they break under simulated crash conditions.

Deductions

Here's what Schroers says was learned from accident investigations:

• **Fuselage** may be relatively undamaged in a crash, with little loss of personnel, although the wing structure, where fuel tanks are presently located, is severely damaged.

• **Many combinations** of impact and inertia forces may act on the fuel tanks and supporting structure in a crash. But the forces may be resolved into a few basic types—fuel inertia forces resulting from deceleration; fuel pressure forces resulting from a change in shape or decrease in volume of the tank; direct impact by an external object upon the leading edge or lower surface of the wing in the region of the fuel tank; bending, torsion or combined bending and torsion of the wing as a whole, and impact loads applied directly to fuel tank bulkheads by landing gear attachments on the bulkheads.

• **Spanwise location of the fuel cell** in the wing affects the severity of the crash from the standpoint of fuel cell damage. Twisting, bending and direct shear loads on the wing from impact forces usually result in failure of the wing at the inboard end, rather than near the outboard end of the wing, indicating that fuel tanks should be located in outboard rather than inboard portions of the wing.

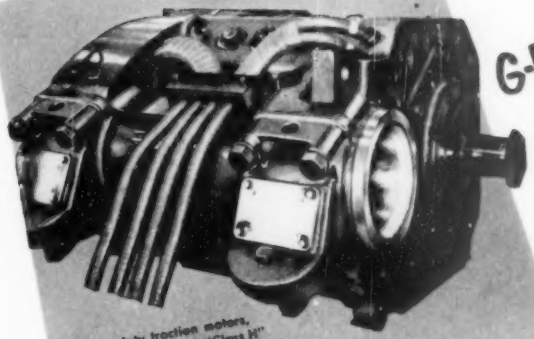
• **Fires resulting from failure** of outboard tanks may not be as serious as those from failure of inboard tanks, since they are farther from the cabin and may allow greater time for escape and rescue.

• **Midwing and highwing** aircraft experience less damage to the wing structure in crashes and fewer serious crash fires than low-wing aircraft, crash experience with some military aircraft has indicated.

This is because the wing tends to

SILICONE PROGRESS

How G-E Silicones in Class H Insulation Help Save Rewind Costs



Heavy-duty traction motors, wound with the new "Class H" insulation made with G-E silicones, withstand high heat and mechanical stress.

Longer life of electrical equipment at high temperatures—resulting in important savings in rewind costs and less down time—is made possible with a new class of General Electric silicone insulation. This "Class H" insulating material provides an unusually high overload capacity. It withstands temperatures up to 480 F for limited periods; has temperature resistance 90-135 degrees Fahrenheit *above* conventional insulating materials.

G-E silicone insulation offers engineers new opportunities to design motors for heavy-duty jobs. Traction motors, often subject to high operating temperatures and mechanical abuse, are being built with armature and field coils wound with glass-backed mica insulation bonded with G-E silicone varnish. These coils don't shrink or loosen at extremely high temperatures . . . last longer because they stay tight in the machine.

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Ounce for ounce, the smaller auto-transformer —wound with G-E silicone insulation — provides three times the output of the larger, conventionally wound unit.

This 200-amp., 50%-duty, 58-volt welding transformer is now produced in the frame size previously used for a 180-amp., 20%-duty, 44-volt unit — thanks to G-E silicone insulation.

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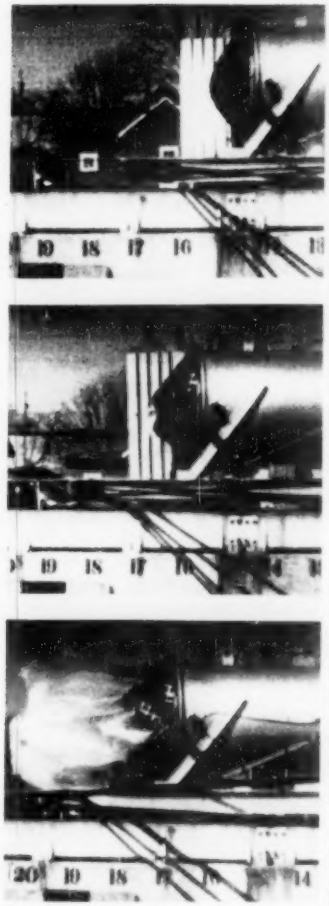

RUBBER BLADDER tank failure is shown in strip sequence of simulated crash test.

stay away from the ground in higher-wing type aircraft. However, the higher wing position tends to greater damage to the fuselage than low-wing position. From the overall crash standpoint, neither type aircraft appears to have any real advantage over the other, as far as crash safety of personnel is concerned.

• **Wings with low-slung nacelles**, and those with high dihedral starting at the root, may experience less damage in crashes and fewer serious crash fires. These features again tend to keep the wing away from the ground during a crash.

• **Crash impact forces** on a wing are principally in a rearward and upward direction. Inertia forces resulting from deceleration are in a forward and downward direction. These conditions are realized in the majority of cases.

• **Crash fires may be fed** by broken fuel

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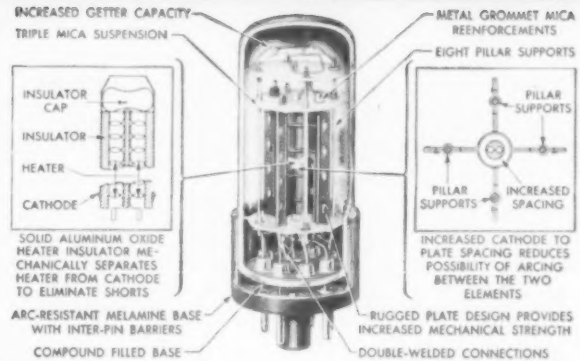
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Heater Current	0.6 amps.	0.785 amps.	1.2 amps.	0.80 amps.
Peak Inverse Voltage	1375 v. (max.)	1375 v. (max.)	1375 v. (max.)	1250 v. (max.)
Peak Plate Current (per plate)	270 ma. (max.)	270 ma. (max.)	270 ma. (max.)	230 ma. (max.)
D-C Heater-Cathode Potential	450 v. (max.)	450 v. (max.)	450 v. (max.)	400 v. (max.)
Cathode Heating Time	1 min.	1 min.	1 min.	45 sec.
Total Effective Plate Supply Impedance	150 ohms (min.)	150 ohms (min.)	150 ohms (min.)	150 ohms (min.)

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Incoloy is a wrought nickel-chromium-iron alloy, developed as a nickel-saving companion to Inconel. It is a high temperature material with good resistance to oxidation, strength at elevated temperatures and workability comparable to that of Inconel.

The principal engineering characteristics of Incoloy are:

- **Oxidation Resistance** – the oxidation resistance of Incoloy is of the same order as Inconel. It has a chromium content of 21%.
- **Physical Constants** – Physical constants are similar to type 330 stainless steel.

INCOLOY
Mechanical Property Ranges of Standard Forms at Room Temperature

Form & Condition	Tensile Properties: Tensile Strength 1000 psi.	Yield Strength (0.2% Offset) 1000 psi.	Elongation in 2 in. per cent	Hardness: Brinell 3000 kg.	Hardness: Rockwell
Rod and Bar					
Cold-drawn					
Annealed	75-100	30-55	50-30	120-170	66-86B
As-drawn	100-150	80-125	30-10	180-290	90B-30C
Hot-Rolled					
Annealed	75-100	30-55	50-30	120-170	66-86B
As-rolled	80-120	35-90	50-25	135-220	74-96B
Forged	80-120	35-90	50-25	135-220	74-96B
Wire					
Cold-drawn					
Annealed	75-105	25-55	50-25	.....	.....
Plate					
Hot-rolled					
Annealed	75-105	30-55	50-30	120-180	.....
As-rolled	80-120	35-90	50-25	135-220	.....
Sheet					
Cold-rolled					
Annealed	75-100	30-55	50-30	.....	88B (max.)
Deep drawing and spinning quality	75-100	30-45	55-35	.....	80B (max.)
Strip					
Cold-rolled					
Annealed	75-100	30-50	50-30	.....	84B (max.)
Deep drawing and spinning quality	75-100	30-45	55-35	.....	80B (max.)
Tubing					
Cold-drawn					
Annealed	75-100	30-55	50-30	.....	88B (max.)

- **Expansion co-efficients** – The expansion co-efficients are approximately those for Inconel. Thus Incoloy should have about the same high temperature resistance to cracking under drastic temperature changes. Because of its relatively high nickel content (34%) the structure of Incoloy is stably austenitic showing no tendency to become embrittled by precipitation of sigma or carbidic phases after prolonged exposure to intermediate temperatures.
- **Room temperature properties** – Room temperature mechanical property ranges of Incoloy mill forms are shown in the table on the left:
- **High Temperature Properties** – High temperature strength properties of Incoloy are comparable to those of Inconel.

In terms of behavior in various high temperature environments it is anticipated that Incoloy will be superior to Inconel in resistance to sulfidation, green-rot and molten cyanide salts. Incoloy is comparable to Inconel in resistance to oxidation.

- **Work Hardening** – The rates of work hardening of Incoloy and Inconel are practically identical.
- **Annealing** – Annealing temperatures for Incoloy should be within the range of 1800° F. to 2000° F.
- **Fabrication** – Incoloy is workable, both hot and cold. It is machinable, though high-speed steel tools should be used.
- **Welding** – For metal arc welding, "132" Inconel electrode is recommended for all gauges. For inert gas metal arc, "62" Inconel filler wire is recommended. Sheet or strip up to $\frac{1}{8}$" may be joined by this method.

Forms supplied – Incoloy is produced in the usual mill forms – billets, rounds, flats, hexagons, sheet and strip, tubing and wire.

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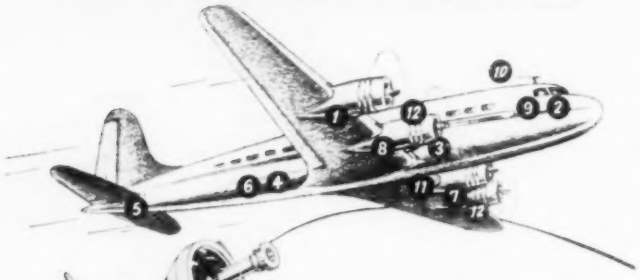

Lord Mountings protect the service life of vital aircraft parts and improve the overall operation of aircraft. From engine to empennage, Lord Mountings contribute a full measure of dependability.

Here are but a few examples of Lord Mountings which may help you on present or future designs:

1. Dynafocal Engine Suspensions
2. Instrument Panel Mountings
3. Communication Equipment Mountings
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lines, even though the fuel tanks are intact and not leaking after the crash impact. Although fires from such sources build up more slowly than when failure of the fuel tank is involved, and permit more time for escape and rescue, they can spread swiftly to the fuel tanks and result in rapid destruction of the aircraft.

• **Fuel lines have broken** numerous times in the nacelle as a result of engine movement, but they can be broken between the engines and tanks and between tanks themselves.

• **Ignition of fuel** results from hot engine parts, flame in the engine exhaust and intake systems, sparks from the engine ignition system and electrical accessories, broken wires in the airplane electrical system, and sparks from striking metallic parts. In actual crashes, it is not generally known how ignition results, but it is generally accepted that the engine is the most probable source of fuel ignition.

• **Tanks with other flammables,** such as lubricating oil and hydraulic fluid, offer a serious hazard as a source of small fires which can spread rapidly to the fuel tanks.

Test Methods

For its tests, CAA used a catapult-carriage-track arrangement. The fuel tank on the carriage is projected down the track at desired speeds up to 100 mph. The tank is brought to a stop at the end of the track by arresting gear or it can be allowed to slide from the carriage and crash into the backstop. Water instead of fuel is carried in the tanks.

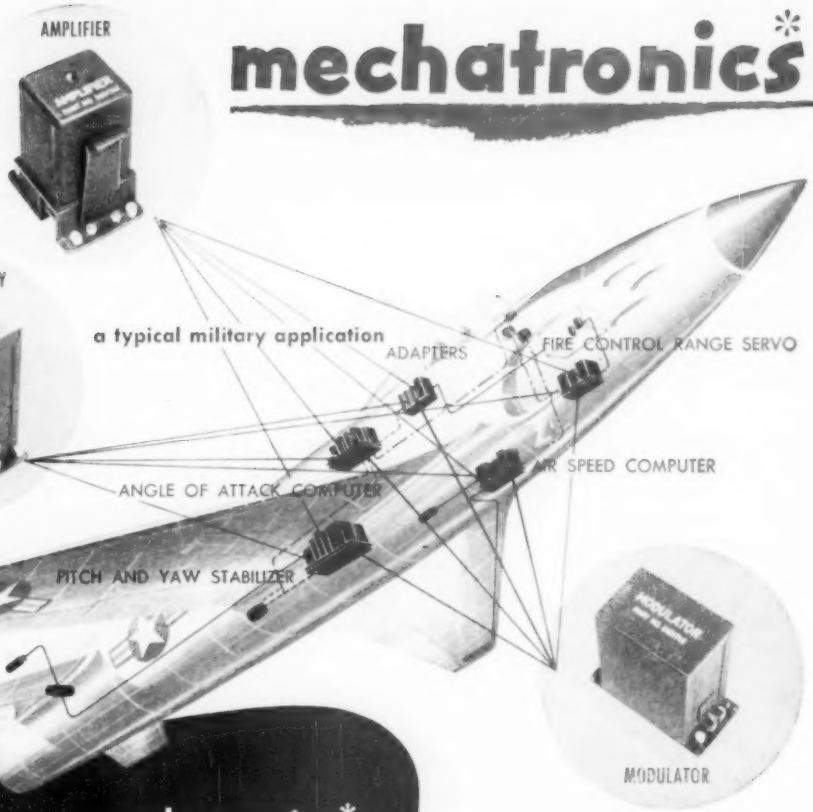
Reproduction of basic types of forces rather than an attempt to reproduce the many conditions found in specific crashes, says Schroers, is the only practical approach to the testing problem. Three basic types of tests, he says, are believed to give the principal type of rupture forces experienced in crashes:

• **Deceleration test.** Here the portion of a wing section containing a fuel tank is rigidly attached to the test car, projected down the track, and stopped by the arresting gear at a predetermined rate of deceleration. Attachment to the wing section is made through the spars, stringers and skin to simulate the path of load transmission in an aircraft structure.

• **Impact test.** In this run, the carriage is arrested at the end of the track, but the tank is allowed to slide off and crash into the backstop, which is faced with a vertical 8-in. railroad tie. This test simulates effects of penetration and change in shape and volume of the tank structure.

• **Deformation test.** This is conducted to introduce into the test section bending and torsion loads of sufficient mag-

mechatronics*



We call it **mechatronics*** as a symbol for Servomechanisms', Inc., *technique* for the multiple and interchangeable use of standard, functionally packaged, servo components in varied electronic and electro-mechanical systems.

mechatronics fulfills the urgent need for:

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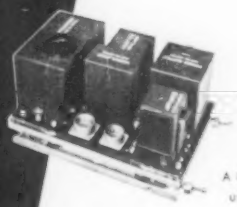

A typical Servomechanisms, Inc., assembly using packaged functions.

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What's doing at JACK & HEINTZ

New J & H Standard System Has Wide Application

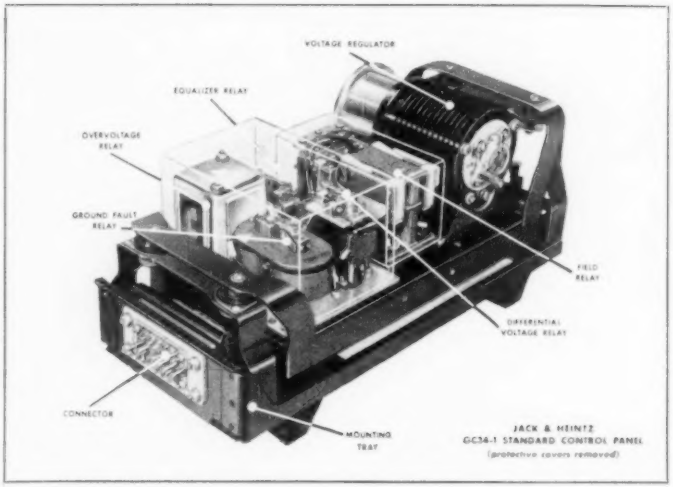
Although rated as standard equipment, there has been no "standard" electrical control system until recently. In the past, each a-c or d-c system has been custom-built for a particular application. For many months, Jack & Heintz, along with selected other manufacturers, collaborated with the Military Services on the development of a "standard" 28-volt, d-c system. Now, due to the combined efforts of the group, a good "standard" panelized system has evolved which can be used on many types of planes with little or no modification. This new system, shown at right, is now available from Jack & Heintz. It is being built to †AMC Exhibit MCREXE22-89A. The J&H designation is GC34-1.

Features incorporated in the GC34-1 offer the following protection: selective overvoltage, feeder ground fault, generator ground fault, reverse polarity, reverse current and pull-down voltage. Other features include: stable and long-life voltage regulators, high-interrupting capacity contactors, accurate paralleling, simplified trip-free resetting, remote or manual resetting, and simple panelized installation on a mounting tray.

The control panel components include: a voltage regulator, differential voltage and reverse current relay, overvoltage relay, ground fault relay, field relay, equalizer relay, rectifier, tickler resistor, three test jacks, manual reset device, control panel plug-in electrical connector and shock mounts.

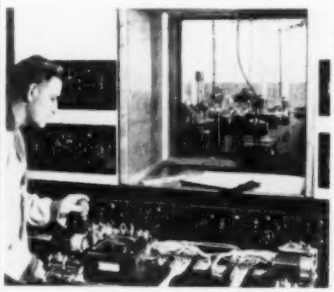
Some of these components we manufacture. Others are carefully chosen by our engineers for incorporation in the system, selected on merit alone from a long list of specialists, manufacturing the devices. Thus, with an open mind and complete freedom to select components, only the best are used in J&H systems.

The following aircraft equipment operate in conjunction with the new "standard" panel and constitute, with the panel, the complete-generator control system: an aircraft engine-driven generator, conforming to †Specification AN-G-4A; main contactor; two 250-millivolt shunts; and generator switch.



J & H Engineers Simulate Most Severe Conditions in Systems Tests

Exhaustive testing is a religion at Jack & Heintz. The ability of any device we make to meet normal conditions is just a *beginning*.



In this J&H "test house", electrical control systems are being tested under conditions that simulate installation, even to wiring and loads.

Because a complete "standard" electrical control system must meet so many different conditions, we design and build much of the test equipment we use.

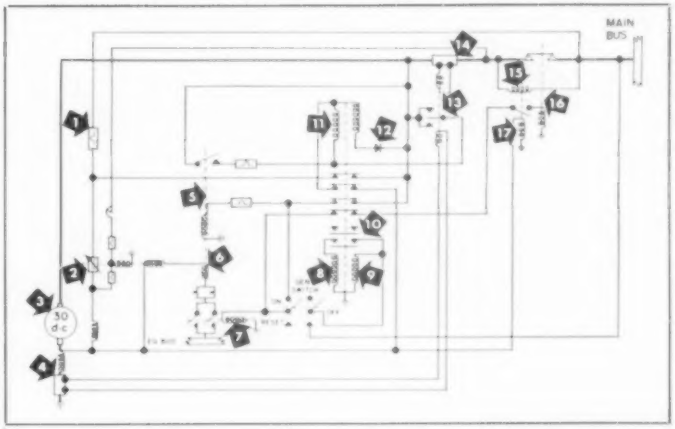
Since systems protective devices may actually increase the hazards of aircraft operation in many cases, the addition of such devices is carefully considered. Our Systems Test Laboratory, accordingly evaluates the effect of additional protective devices on the complete system by seeking failure, to prevent it later in actual service. Customers are invited to be present during shakedown runs and to help us try to make the system fail, to insure its future dependability.

And testing doesn't necessarily end there. During mock-up tests of the system in the customer's plant, we usually have one of our engineers on hand to witness the tests, pursue modifications to meet new requirements and generally render his services toward making the system perform satisfactorily.

... Standard Control System

SCHEMATIC DIAGRAM OF GC34-1 PANEL AND ASSOCIATED EQUIPMENT WITH KEY TO FEATURES

1. Tickler resistor—Maintains proper polarity of shunt field.
2. Voltage regulator to MIL-R-6809.
3. 30 d-c generator.
4. 250-millivolt shunt.
5. Overvoltage relay—Senses generator output and energizes field relay trip circuit on an overvoltage fault.
6. Selector coil—On parallel operation, senses paralleling current and reduces trip value of overvoltage relay on faulty system.
7. Equalizer relay—Connects equalizer circuits for paralleling.
8. Field relay reset—Circuit energized from the main bus on closing reset switch.
9. Field relay interlock—Provides trip-free resetting action.
10. Auxiliary circuit breaker contacts.
11. Field relay trip coils—Open field relay circuits on faults.
12. Blocking rectifier—Closes field relay trip circuit when reversed generator is connected to system.
13. Ground fault relay—Senses unbalance in voltage across shunts, closes field relay trip circuit on a generator or generator feeder fault.
14. 250-millivolt shunt.
15. Differential voltage coil—Closes main contactor circuit when generator voltage is above bus voltage.
16. Main contactor—High interrupting capacity.
17. Reverse current coil—Senses generator series field drop and opens main contactor circuit on reverse current.



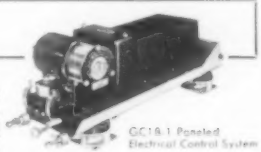
Protection Offered Under Tough Conditions

The GC34-1 Systems Panel and associated equipment are designed for continuous duty to control and protect generators under the following tough conditions or natural combination of conditions:

- Barometric pressures ranging from 30 inches of mercury down to 3.5 inches (approximating an altitude of 50,000 feet).
- Temperature range: −67°F to +160°F.
- Relative humidity ranging up to 100%.
- Exposure to air-borne sand and dust.
- Exposure to salt-laden moisture.
- Exposure to fungi.
- Operates within specified limits in any position.
- Exposure to aircraft vibration.

Military specification numbers as used herein are for purposes of product identification only, and do not necessarily imply specification conformity.

Chief Engineer's Corner


GC18-1 Paneled Electrical Control System

"System" as defined by J&H Engineers is a "combination of the minimum number of components, of the most rugged design, assembled into a simple, reliable mechanism to accomplish one or more functions as specified by our customers."

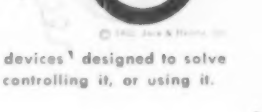
Any engineer can design a system to accomplish a list of functions. But the utmost in design skill is necessary to add the requirements of circuit simplicity, maximum reliability, ease of maintenance, minimum adjustments, experience and knowledge of aircraft requirements.

Several pilots are on our engineering staff . . . they visualize our equipment from the cockpit viewpoint. That's why we often ask you to let our engineers see your airplanes, and why we welcome the opportunity of discussing your problems and future plans with your engineers.

After our capable engineers have designed your system, we know that before it is shipped, it must be wrung out in our Systems Test Laboratory. We know we'll find some "bugs" and we'll welcome your visiting us during the tests to help find them.

Ask for the new J&H Technical Bulletin No. 1150-1. Includes a complete table of models and specifications. Write JACK & HEINTZ, INC., Dept. 105-B, Cleveland 1, Ohio.

JACK & HEINTZ
Rotomotive
EQUIPMENT



means electrical, hydraulic or mechanical devices[1] designed to solve unusual problems of developing power, controlling it, or using it.

Take the case of a typical aircraft tachometer. It indicates engine speed in terms of r.p.m. But this important information can only be as reliable as the messenger that delivers it—the flexible shaft. And because reliability is paramount, aircraft designers have learned to count on S.S.White flexible shafts to perform this all-important task of providing a direct mechanical connection between the engine and the instrument. Experience has proved that S.S.White flexible shafts give fully dependable service under all types of aircraft conditions. They require little or no attention and are virtually immune from any kind of trouble that might affect their operation including vibration, extreme temperature changes and surging speeds.

When your design calls for power drive or remote control, it will pay you to consider first the many outstanding advantages of these versatile S.S.White "Metal Muscles".

SEND FOR BULLETIN 5008 It contains essential facts and data on flexible shafts and tells how to select and apply them.

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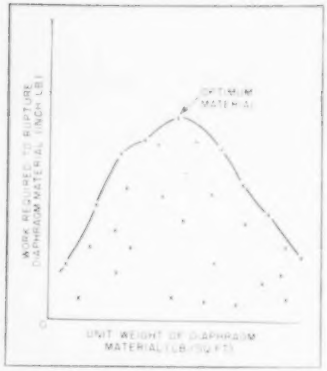
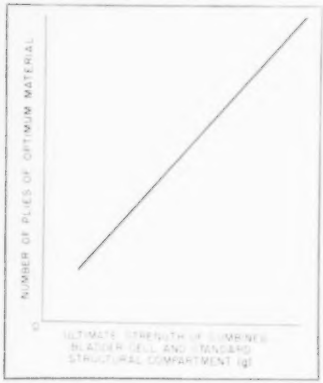



NUMBER OF PLIES OF OPTIMUM MATERIAL
0
ULTIMATE STRENGTH OF COMBINED BLADDER CELL AND STANDARD STRUCTURAL COMPARTMENT (g)

PLOTS SHOW unit weight of bladder material vs. work required for rupture (upper graph) and tank strength vs. plies of material (lower graph).

nitude to cause partial failure of the tank and wing structure. The condition is applicable particularly to integral type tanks. Impact is obtained through steel structures attached at each end of the wing section. Position of the steel structures causes combined chordwise bending and torsion forces.

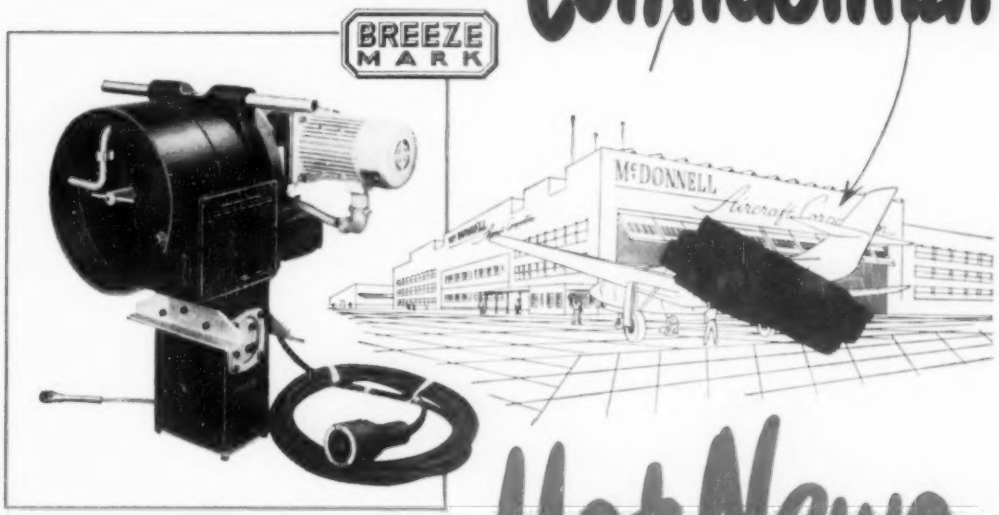
These three tests says Schroers, can be applied to any type of fuel tank installation in a wing structure and show how structure and fuel cell respond to these reproducible and measurable forces simulating basic forces in aircraft crashes. Combined results of the tests on one model of tank show its specific weaknesses and allow an overall evaluation of its crash-resistance.

Conclusions

Here are crash-hazard conclusions derived from the fuel tank program:

• **No present design** of fuel tanks in use in transport-type aircraft will withstand to any reasonable degree the forces encountered in some crashes where personnel can be readily expected to survive the crash impact. This

the Installation is Confidential



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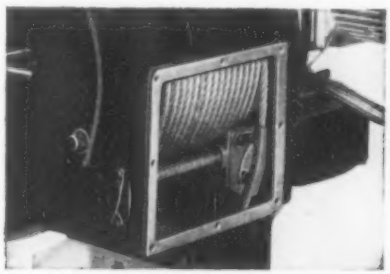

Close-up view of winch with cover removed, showing detail of cable crank and shaft mechanism.

refers to the cases where high, local impact forces are obtained on the wing at the fuel tank location, or where the wing tends to break off through the fuel tank section.

No design of fuel tanks in use today is significantly better in this respect than any other type. . ."

• **Load distribution** is not even during the type of crash conditions considered. Some portions of the aircraft structure are, on the average, subjected to lesser or greater loads than others. The strength and weight tank required would depend on its location.

• **Prevention of crash fires** in fuel tanks is best promoted when: the tank is placed outboard in the wing at a location where breakage probably will not occur; the tank is placed behind a reasonably heavy spar and leading edge section which can absorb direct impact; an underslung nacelle is used, tending to keep the wing away from the ground; the tank is designed to withstand high impact and deceleration loads, and landing gear loads are not applied directly to the tank structure.

• **Flexible bladder tanks,** which are free to shift in the structural compartment, and have sufficient strength and energy-absorbing properties to resist rupture when the surrounding aircraft structure disintegrates, offer the most promising and readily available structural solution.

• **Automatic disconnect couplings** should be installed at proper locations on fuel lines to seal the fuel in the lines, and prevent their breaking because of separation of the engine from its mount, shifting of fuel tanks, structural breakage, etc.

▶ **Bladder Tests**—Although CAA, in collaboration with a rubber company, already has developed a bladder tank that has stood up under simulated crash tests with loads exceeding 20Gs, additional tests are being conducted to determine if this is the final answer. An optimum tank, according to Schroers, will have a high ratio for energy required to rupture the bladder cell material under dynamic load to the unit weight of the material.

A large number of representative fuel tank bladder cell materials are being checked. Specimens are fabricated as circular panels 3½ in. across. Grid lines on the panel facilitate photography and evaluation of test results. The panel is fastened as a diaphragm to a steel tank by a circle of bolts. The length, or "head" of the tank corresponds to the head of fuel tanks in modern transport-type aircraft, where head is defined as the length of the tank parallel to the longitudinal axis of the craft.

The tank is projected down the track at speeds up to 100 mph., then suddenly stopped by the arresting gear near the end of the run. The resulting fluid pressure in the tank corresponding to the number of Gs applied in the test ruptures the diaphragm.

From data obtained a curve may be constructed from the locus of points representing those materials absorbing the most work in the rupture process, in relation to their unit weight. The best material is that represented by the point at the top of the curve. To advance this research, bladder cells of the optimum material will be installed in a standard structural compartment embodying the strength properties of a typical supporting structure, then subjected to deceleration and impact tests.

Using the optimum material with a wide range of plies, a curve will be established for the relationship of the number of plies and ultimate strength in Gs of the bladder cell and structural compartment. This ultimate strength is synonymous with fuel tank design load.

When a final solution for the bladder-cell-type tank is reached, the integral-type tank problem will be tackled.

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The ability to carry maximum currents with only a minimum voltage drop is an outstanding characteristic of Bendix Scinflex Electrical Connectors. This important feature is only a part of the story of Bendix success in the electrical connector field. The use of Scinflex dielectric material, an exclusive Bendix development of outstanding stability, increases resistance to flash over and creepage. In temperatures from −67°F. to +275°F. performance is remarkable. Dielectric strength is never less than 300 volts per mil. All in all, no other electrical connector combines as many important exclusive features as you will find in Bendix Scinflex connectors. For higher efficiency in your electrical connectors be sure to specify Bendix Scinflex. Our sales department will gladly furnish additional information on request.

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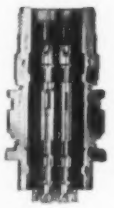

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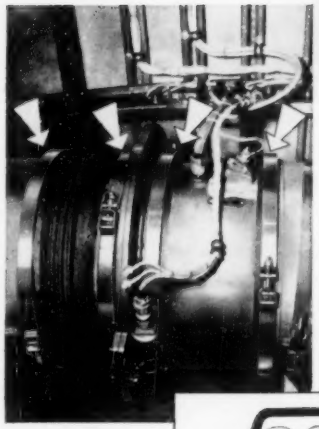
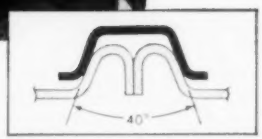
ENGINEERS' NOTEBOOK

HEATING SYSTEMS





V-BAND COUPLINGS

simplify assembly and maintenance

Marman V-Band Couplings connect iris valve and expansion joints of the Douglas C-124 Globemaster II anti-icing and cabin heater. They withstand a temperature range of -65°F to 450°F with an operating pressure of 2.5 p.s.i. Marman sheet metal flanges welded to the ducts provide a quick, economical seal and the quick coupler feature of the coupling latch speeds assembly and disassembly.

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How Much Work Can Frigid Digits Do?

Fifty degrees below zero is numbing cold—but the Air Force has to keep em flying even in such frigid Arctic weather.

Up till now, planes have been getting the lion's share of heaters and other means of combatting cold. And the men who work on the planes have had to fumble and freeze.

The Air Force doesn't know what kind of gloves should be worn, for example. Neither does it know how much work a mechanic can be expected to perform during a given period.

To find out, Lt. Robert A. McCleary, research psychologist at the USAF School of Aviation Medicine, Randolph AFB, Randolph, Tex., is conducting a series of tests in a cold room.

► **Testing Device**—To measure manual dexterity in extreme cold, Lt. McCleary designed a wooden box roughly the size of a tool chest. It has a lid fastened securely by bolts safetied with lockwire. And inside the box is a brush assembly from a B-50 Superfortress propeller.

A volunteer airman (from the basic training course at Lackland AFB), dressed in standard USAF Arctic garb, tackles the job of opening the box, disassembling and reassembling the brush unit, and locking the box again. During his test, temperature of the room is maintained at an Arctic level.

Time to do the job, skin temperature, personal reactions and comments of the subject are recorded and correlated to obtain an index of cold-weather performance.

Lt. McCleary expects to find basic facts about mechanical ability in Arctic environments. And when these facts are analyzed, they may lead to recommendations for new clothing, to new criteria for personnel selection for Arctic duty, to new standard performance tests for mechanics in any kind of weather.

Help a jet go further..faster ..with the new Thompson AIR-TURBINE PUMP

Typical afterburner pump model weighs only 9.0 lbs., but delivers 35 H.P.

Air-turbine operates at speeds up to 30,000 R.P.M. with 500° F. air. The pump will operate over −65° F. to +250° F. temperature range. Can be used with all military fuels.

Again, Thompson leadership brings you a Thompson "First" . . . the first fully-proved, service-tested air-turbine pump.

New, and proved in the air, the Thompson air-turbine pump uses air from the jet compressor to pump fuel to the afterburners for additional jet thrust. It can produce a pumping effort equivalent to 35 H.P., yet weighs only 9.0 lbs.

Designers like the flexibility of placement and installation that the Thompson air-turbine pump provides.

May we tell you more about this newest Thompson development and other developments of air-turbine accessories?

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- These same insulating materials are used to double the power per pound ratio in electric machines.
- Silastic,* the Dow Corning silicone rubber is used to seal hot air at 600°F., hot oil at 350-400°F., limit switches and bomb bay doors at —100°F.
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AVIONICS

AF Base Uses Homemade Homer

Delivery was uncertain on equipment to bring in lost pilots, so three CEA employees built it in two days.

Ingenuity and about $300 combined in Operation Snowball have brought nearly a score of lost aircraft safely home to Columbus AFB, Miss. Snowball is the unlikely name given to a homing antenna built from miscellaneous parts by three employes of California Eastern Airways, civilian contractor operating the base.

Snowball proves the old maxim about necessity being the mother of invention. The increased tempo of night flight training at the base made it mandatory to have some kind of a homer antenna for guiding lost pilots. And deliveries of electronic equipment being what they are, the base couldn't manage to get the needed unit immediately.

Instead, three Cal Eastern employes—Joe Morrow, Robert Montgomery and Carroll Dykes—concocted a temporary rig within 48 hours of being asked to tackle the job. Later, this temporary equipment was revised and prettied up a bit, and a motor and indicator unit have been added.

► **Avionic Design**—Snowball is a cylindrical parabolic antenna with closed ends. The mouth is 100 in.—1 wavelength—for the distress frequency of 121.5 mc. Depth of the unit is 50 in., half a wavelength, and the height is 36 in. A standard AN-104-B mast is located ¼ wavelength behind the mouth.

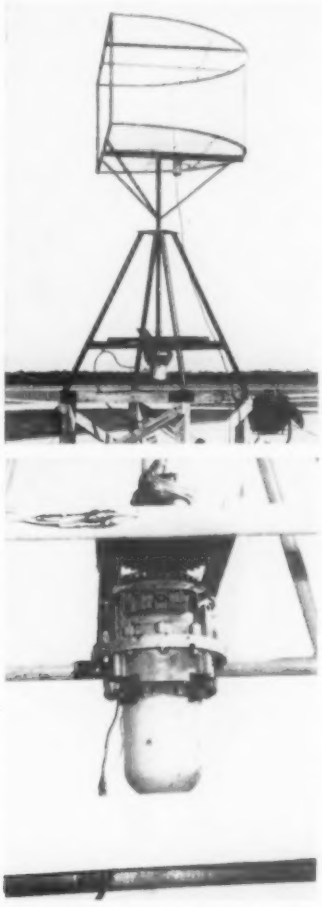
The antenna frame is lightweight tubing covered with hardware cloth. Supporting structure is a quadraped mount, from which extends a central shaft to which the cage is fastened. The unit can be rotated by means of a motor reclaimed from an unserviceable propeller hub unit.

Overall height of the assembly is about 15 ft., but installed height to antenna top is 75 ft. With this elevation, contact can be made with planes as far as 150 mi. away, depending on flight altitude.

The existing drive from the motor does not permit continuous rotation of the antenna; instead, it must be reversed at the completion of each complete revolution.

Reversing signal comes from a Selsyn pointer through two microswitches. Selsyn unit is driven by the same motor that rotates the antenna.

► **In Operation**—When a pilot decides that he's had enough and tells the tower he's lost, the Cal Eastern homer goes into action. The pilot activates his VHF/DF gear and the antenna starts its rotation to pick up the signal.



HOMING ANTENNA, as installed on hangar roof at Columbus AFB by Cal Eastern employes. Rotor motor (bottom) was from prop-pitch-changing mechanism.

Signal strength is read on a vacuum tube voltmeter which measures the amount of rectified signal voltage. Voltages received on bearing and reciprocal heading are different enough so that there is no difficulty in distinguishing between the two.

Actual bearing vector is read from a Selsyn indicator and the tower can then give the pilot the correct heading to intersect the base.

Refinements on the apparatus include the availability of a number of voltage ranges to take care of varying signal strength due to range, and means to cut out the automatic volume control to get sharp peaks of the indicated voltage.

NBS Unit Sorts Telemetered Data

Four reference levels can be supplied to each channel of telemetered intelligence by a new calibrator unit developed by the National Bureau of Standards. The unit uses cam-operated switches for transmission control.

The device was designed to identify telemetered information from a guided missile in flight. But compactness and durability make the unit particularly suited to applications in aircraft and projectiles as well.

The calibrator supplies each intelligence channel of the telemetering equipment with four sequential references of modulation. In this way, the record is provided with known levels of modulation from which received data may be interpreted.

Two groups of noise-free, cam-operated switches give transmission control. The first group interrupts briefly and periodically the normal channeling of information to the r-f transmitter. In place of this, the calibrating circuit is connected to the output.

The second group of switches passes step-calibrating signals to the transmitter during the interruption provided by the first group of switches. The step-calibrating cam cycles ten times for each cycle of the interrupter; four modulating signals are passed with each cycle of the cam. Each interrupted channel receives identical calibrating signals.

Switches and cams are housed in a cylinder 2 in. long and 4 in. in diameter. Drive motor for both interrupter and calibrator cams is mounted at one end of the calibrator.

Expansion to 20 channels is possible. It involves installing ten more switches, increasing the width of the slow-speed cam and enlarging the housing. Such an arrangement would permit calibrating two channels simultaneously.

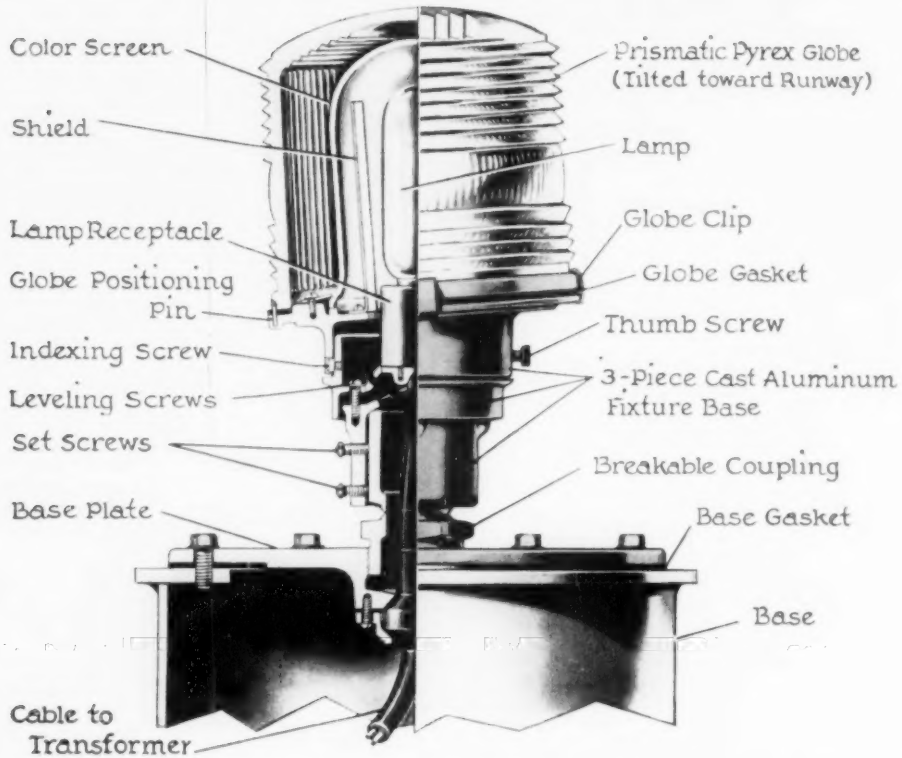
The mechanism can also be used to modulate the transmitter during preflight checks. The calibrator simulates information transmitted and permits regulation and testing of the transmitter-receiver prior to flight.

CROUSE-HINDS NEW

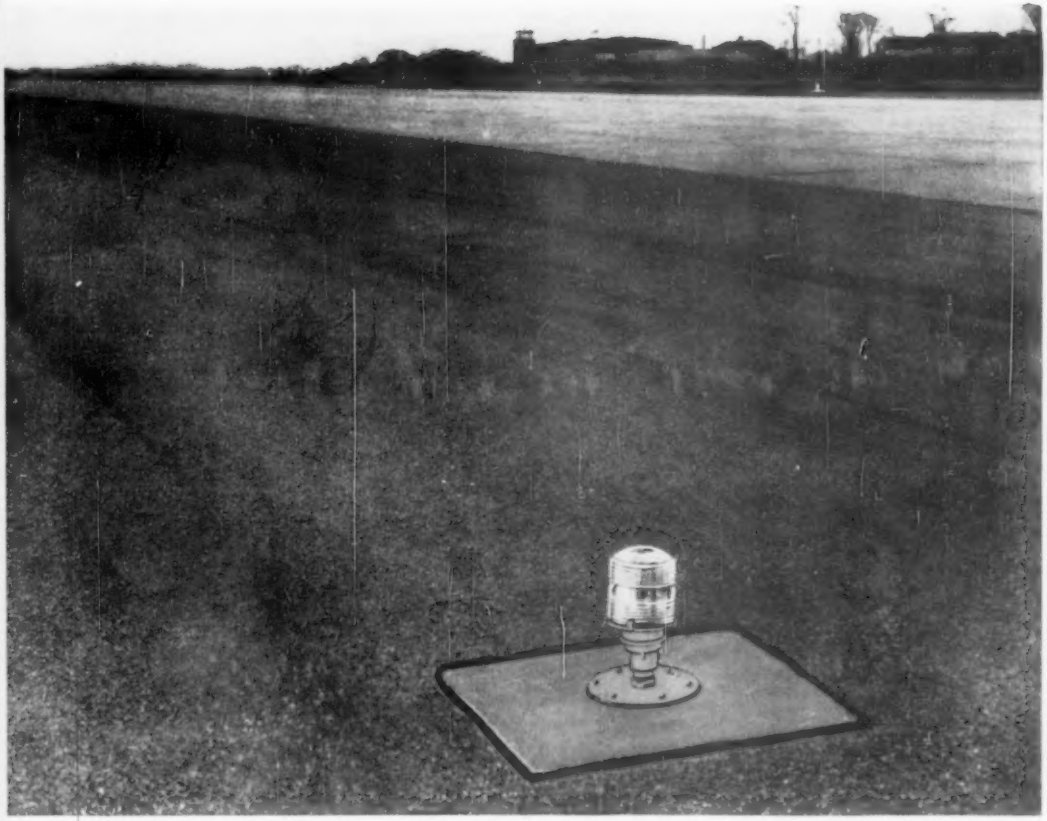
Fixed Focus Bi-Directional

HIGH INTENSITY RUNWAY LIGHT

A radically new optical design that utilizes all the light from a 200-watt lamp.



AIRPORT LIGHTING • FLOODLIGHTS



The CAA recommends that all instrument landing runways be equipped with high intensity runway marker lights so the runway can be properly outlined to a pilot either day or night under conditions of poor visibility.

Crouse-Hinds type HRL marker light is constructed in accordance with CAA specification L-819, and consists of a 200-watt marker light head assembly with a prismatic lens optical system, a breakable coupling, and a base plate.

It is designed to utilize the greatest possible amount of light from a 200-watt lamp. The Pyrex prismatic globe directs powerful beams of light up and down the runway. On the off runway side, type HRL gives a much higher candlepower than the minimum specification requirements, which enables the pilot to easily locate the runway while encircling the field.

Advantages of type HRL are:

1. Less Hazard to Aircraft – due to light weight and low mounting height.
2. Most Economical Installation – only a single No. 8 cable is needed.
3. Conversion Feature – Type HRL Fixtures may be installed on most existing types of flush marker light base housings.
4. Easier maintenance and lower replacement cost.

The Crouse-Hinds Company offers all three types of high intensity runway lights: Type HRL (illustrated above) to meet CAA Specification L-819, type HRC to meet Specification L-818, and Type HSL to meet Specification L-820. All are approved by CAA, and all are carefully built to Crouse-Hinds' high standard of quality from the finest materials.

Crouse-Hinds engineers are, therefore, in a position to offer impartial technical advice on the advantages of any of these three systems. An outline of the main features of each system, including installation cost, is included in Bulletin 358-F. Send for your copy today.

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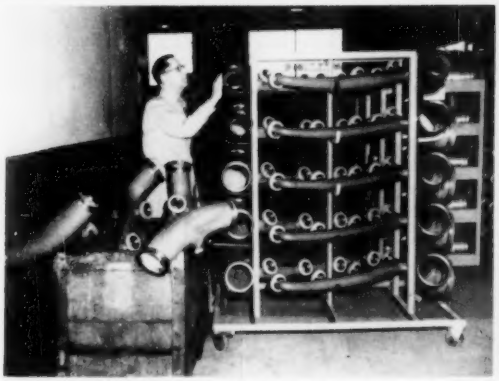
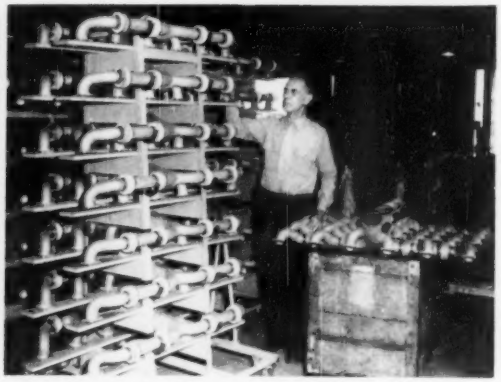


CUSTOM-MADE rack used to store P&W exhaust sections.



RYAN RACK designed for Continental exhaust sections . . .

SEPARATE compartments protect GE J-47 jet engine cowls.

J-47 COMBUSTION chambers are protected on own special cart.

Special Mobile Ryan Racks Protect Parts

Custom-tailored carts make handling easier, save floor space, cut damage to engine components.

Moving and storing metal parts in various phases of a manufacturing scheme, if not planned carefully, can be a headache—a cumbersome and expensive operation.

Ryan Aeronautical Corp.'s plant engineering mechanical design group came to this conclusion and did something about it—with special, custom-tailored racks that pay off in three ways:

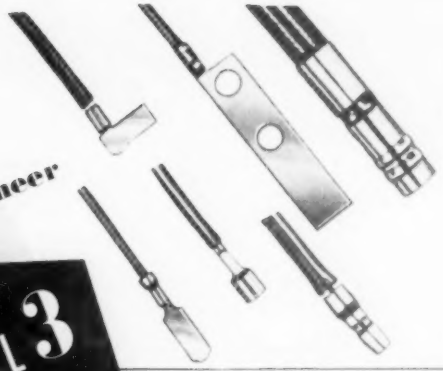
- Valuable factory space is saved.
- Handling is vastly eased.
- Expensive engine components are given sure protection against damage.

Some of the precision parts that Ryan has to haul around its shop include external fuel tank rings, exhaust system and header sections, and jet engine cowls, struts and combustion cans.

The conventional open-top tote cart—a box on wheels—was usually employed for moving these parts to inspection, final packing and shipping. This conveyance, pushed by a worker, introduced the danger of the parts knocking against each other.

Another poor feature of this transportation scheme was the haphazard method necessarily involved in stacking the parts into carts which had not been designed to accommodate them in the first instance. The loading scheme was left strictly to the ingenuity of the individual, who generally dovetailed the components as conveniently as he could, for best utilization of cart space. In some instances, the units being toted wouldn't fit and lining

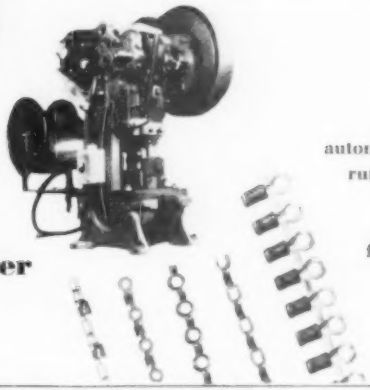
for design engineer



New plus values—new designs—new uses! AMP solderless pins, plugs, hooks, contacts, and specially shaped terminals do more than give sound electrical contact—they can be incorporated into the design of the product itself! Keep AMP in mind to simplify wiring, eliminate unnecessary parts, speed production, and reduce cost.

AMP MEETS ALL 3 REQUIREMENTS

production engineer



With wire termination it's installed cost that counts. Set up fast, efficient AMP automatic machines for production runs of 2,000 to 4,000 complete terminations per hour! Terminals feed in strip form from spools. Each connection is strong, neat, uniform.

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AMP's superior design, production, and performance tolerances have yielded approval for critical applications by U. S. Army, Navy, Air Force, and various civilian agencies. List on request.

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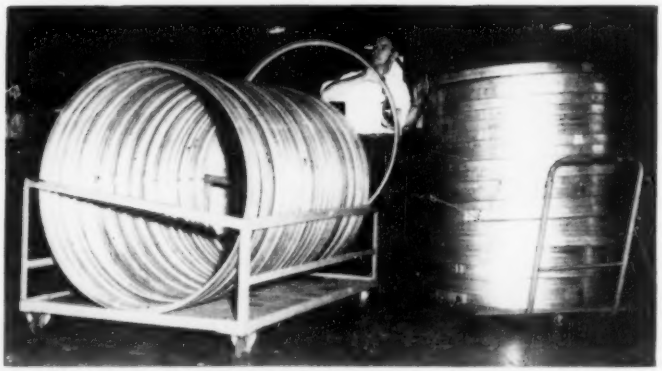
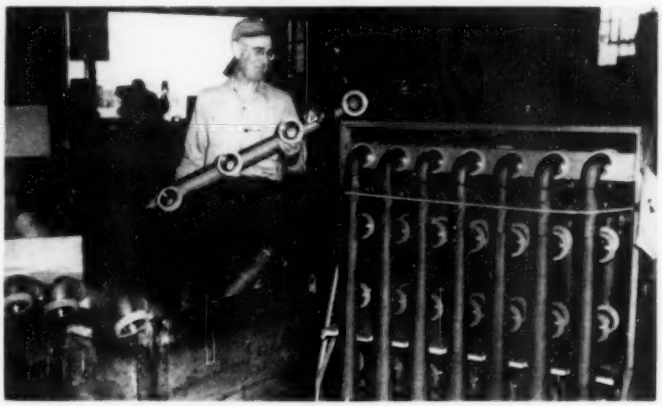


EXTERNAL fuel tank rings can't rub together on new rack, left. Old way on right.

J-47 STRUTS stacked in mobile rack; protects parts in transit, saves floor space.



ENGINE header sections racked vertically can't jostle in Ryan special carts.

over the cart sides, just ripe for damage.

The new approach with the special racks eliminated these production inconveniences. These racks are so compactly arranged that a minimum of space is needed to accommodate a maximum number of parts—the stacking scheme for the engine struts makes it possible to hold 204 of these J-47 parts, several times more than could be accommodated in the conventional tote cart.

And security in transportation is stressed—each piece has its own allotted space with sufficient separation to prevent rubbing. This separation is done with marked space economy. Some

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- Assure installation flexibility as units need not be prefabricated.
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units are supported with rubber covered hooks.

Pushing, as in the case of the former tote-cart, is out. The new racks can be pulled, several at a time, by a small truck.

USAF CONTRACTS

Following is a list of recent USAF contracts announced by Air Materiel Command.

Aeroquip Corp., Jackson, Mich., aircraft hardware—steel fittings; base assy., $82,158.

Aircraft Hardware Mfg. Co., Inc., 818 Edgewater Rd., New York, aircraft hardware, $62,388.

Aluminum Co. of America, 1200 Ring Bldg., Washington D. C., aluminum sheet, $253,916.

Auto-Lite Battery Co., Toledo, batteries, 2,258 ea., $155,612.

Beech Aircraft Corp., Wichita, airplanes, exceeds $250,000.

Bell Aircraft Corp., Niagara Falls, N. Y., overrun on contract, $57,809.

Bendix Products div., Bendix Aviation Corp., South Bend, Ind., pivot shaft & cone assy., exceeds $250,000; wheel & brake assemblies, $28,748; material, $16,915; wheel assy., spare parts and technical data, $25,527; spare parts, exceeds $250,000.

Bennett Foragen Inc., 1005 S. Lafayette Blvd., South Bend, Ind., stand test, 16 ea., $40,927.

E. W. Bliss Co., 1375 Raff Road, S.W., Canton, O., forging press, exceeds $250,000.

Bolsey Corp. of America, 118 E. 25th St., New York, 16 parts for PH-324A and PH-371-A Camera, $26,605.

Carey Electronic Eng. Co., 1850 Clifton Ave., Springfield, O., commercial hardware, 50,000 lbs., $38,400.

Chisholm-Ryder Inc., Niagara Falls, N. Y., tools, $87,100.

Consolidated Vultee Aircraft Corp., Fort Worth, Tex., $12,785.

Credda, Inc., 19 West 26th St., New York 10, aircraft camera, exceeds $250,000.

Eclipse-Pioneer div., Bendix Aviation Corp., Teterboro, N. J., turbo mechanical power system, $47,259.

Electrolux Corp., Forest Ave., Old Greenwich, Conn., dynamotor, exceeds $250,000.

Fairchild Aircraft, Fairchild Engine & Airplane Corp., Hagerstown, Md., miscellaneous kits for retrofit on C-119C aircraft, exceeds $250,000.

Fairchild Camera & Instr. Corp., 88-06 Van Wyck Blvd., Jamaica, N. Y., solid lock, exceeds $250,000.

Flex-O-Tube Co., LaFayette at 14th St., Detroit, aircraft, hard to control fitting, base assy., 500,000 ea., $72,000.

General Tire & Rubber Co., Akron, jack, aircraft, exceeds $250,000.

Goodyear Tire & Rubber Co., Inc., 1144 East Market St., Akron, wheel & brake assembly, $80,259; wheel assy., brake assy., spare parts and technical data, $154,389.

Graham Transmissions, Inc., 3764 N. Holton St., Milwaukee, Wisc., transmissions, 105 ea., $122,258.

Greer Hydraulics Inc., 454 Eighteenth St., Brooklyn, N. Y., hydraulic test stand assy., 10 ea., $57,580; test stand, 11 ea., $62,927.

Gremco, Inc., Ft. Worth, ground power units, 26 ea., $199,000.

Indianapolis Tent & Awning Co., 420 West 13th St., Indianapolis, formalization of contract change notifications, $41,700.

Instrument div., Thomas A. Edison, Inc., West Orange, N. J., technical representative services, $25,476.

Kaiser Aluminum & Chemical Sales, Inc., 919 N. Michigan Blvd., Chicago, aluminum sheet, $25,219; aluminum alloy sheet, $89,620.

Kaiser Manufacturing Corp., Willow Run, Mich., airplanes, exceeds $250,000.

Keystone Watch Case div., The Riverside Metals Co., Riverside, N. J., indicator, 11,531 ea., $205,922.

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SHELBY SEAMLESS TUBING keeps weight to the very minimum and yet assures the utmost in ruggedness and shock-absorbing qualities. Designers have used it for many years in every type and size of aircraft.

No other construction method enables you to build so strong, so light, so durable as with seamless steel tubing.

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SHELBY SEAMLESS Aircraft Tubing

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Air Research Extends Gas Turbine Field

- **Use for auxiliary power in aircraft is rising.**
- **Sizeable Navy orders point up the trend.**

By George E. Christian

Los Angeles—The gas turbine has rammed its way into another energy supply realm—aircraft auxiliary power.

Indication of the extent of this invasion is the $47 million in orders which AiResearch has been awarded by Navy's Bureau of Aeronautics for auxiliary turbine powerplants. This business represents the largest production orders ever placed by the military for small gas turbine engines, according to J. C. Garrett, president of AiResearch's parent, the Garrett Corp.

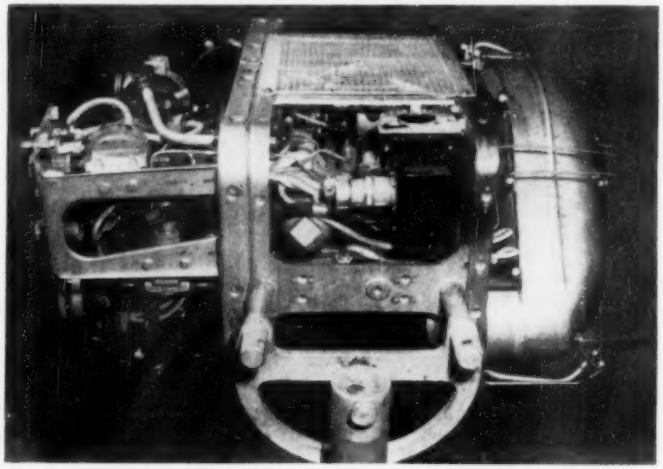
Among the turbines on order are units for driving the alternators on Martin P5M-1 and Chance Vought F7U aircraft, the manufacturer says.

▶**In Solid**—Thus AiResearch has entrenched itself squarely in the market of gas-turbine-powered aircraft pneumatic systems. The company offers complete systems, from power source to air (or gas turbine) motors, based on eight years of intensive research in the small gas turbine field. The company motto: "Thin Air is Our Business."

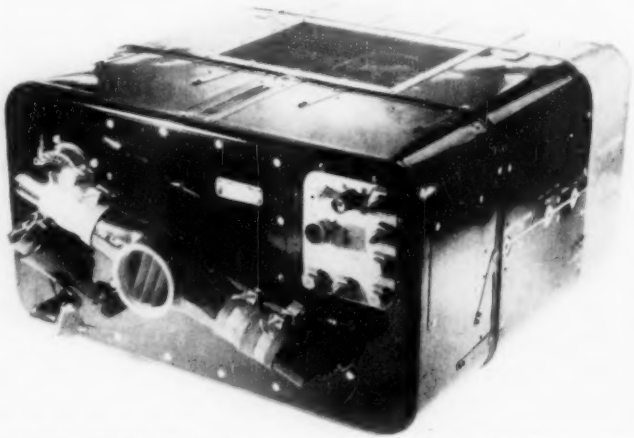
AiResearch's interest in gas turbines has not been so much as a prime mover, not to put it into direct competition with the piston engine, according to Homer J. Wood, the company's assistant chief engineer in charge of turbo machinery. Rather, the incentive was to find gas turbine applications that the piston engine could do only clumsily if at all. And AiResearch felt that auxiliary power systems should follow the progression of the main powerplant: from piston engine to gas turbine.

▶**Navy Order**—Components in the large Navy order include auxiliary gas turbine engines, air turbine starters and control valves for seven types of Navy turbojet and turboprop aircraft manufactured by five major aircraft companies.

Already in substantial production on a moving assembly line, the new military business will boost AiResearch production to thousands of units annually for several years. To speed up output, the manufacturing facilities of the company's main plant here will be augmented by the resources of the firm's latest production facility, a modern plant has just been opened at Phoenix, Ariz.



GAS TURBINE COMPRESSOR is the heart of AiResearch pneumatic power system.

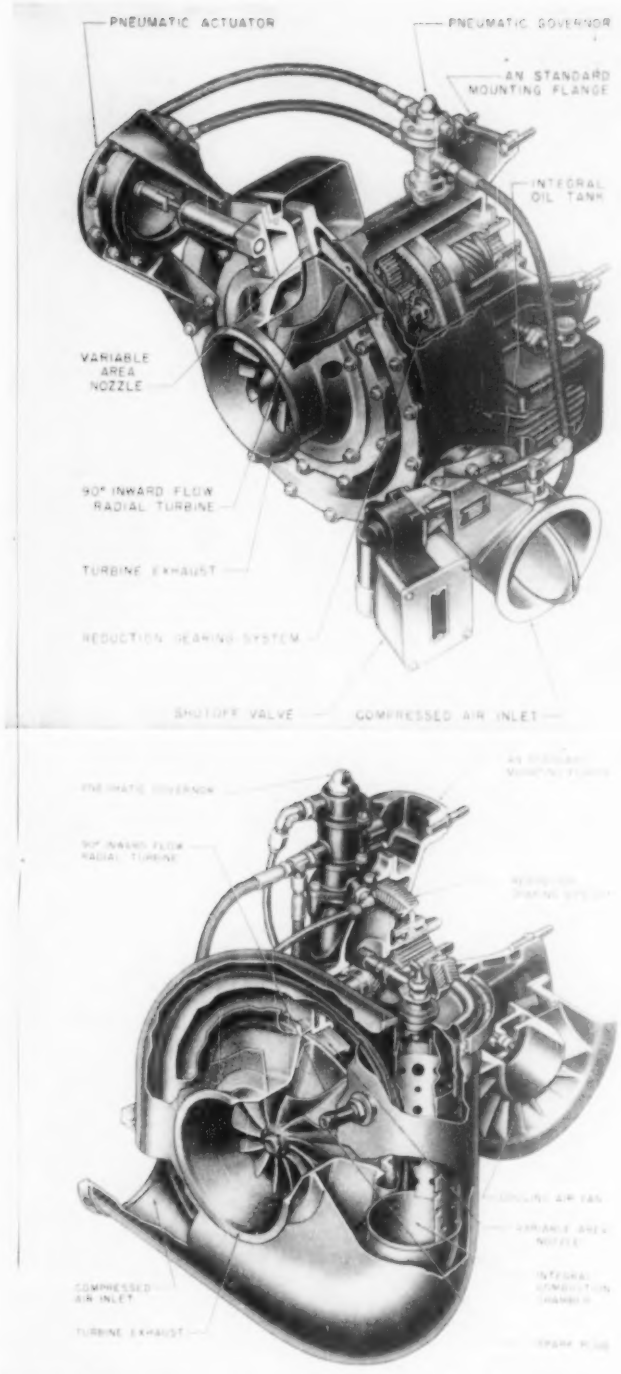


CASED IN STAINLESS STEEL, compressor is completely packaged auxiliary powerplant.

▶**Why the Gas Turbine?**—Power requirements for aircraft ancillary systems have skyrocketed with the ever-increasing number and complexity of aircraft accessories and systems.

Stratospheric altitudes have complicated the operating problems of these accessories, which are usually scattered all over the airplane. The components' operating efficiencies are often seriously impaired by thin, cold air.

Wood estimated that at today's extreme altitudes "problems have been considered when the power utilized by the aircraft for services other than propulsion has amounted to between 5-10% of the available propulsion power." A figure of 1-2% would be av-



POWER AUXILIARIES: air turbine motor (top), gas turbine motor (bottom).

cuge for plane operation at sea level.

Complexity of the problem of providing multiple drives of considerable horsepower on the accessory drive case of an engine that is restricted in weight and dimensions has furrowed the brow of many an engineer.

The trend to slimmer nacelles, following the introduction of gas turbine powerplants, further complicates the business of hanging clusters of accessories directly on the engine. And the greatly increased weight of the accessories may impose damaging stresses on the engine's accessory case.

AiResearch holds that the "best auxiliary power arrangement utilizes both auxiliary power units and main propulsion engines as a power medium—and further, that compressed air (low pressure) is highly desirable as a power medium. (The company) does not attempt to prove that the system proposed is the best for all possible aircraft types and/or operations, since the future of aircraft development is far too vague for such conceit."

AiResearch's main objective, according to W. J. Pattison, assistant to the president, was to develop both the heart and the muscle for a low pressure aircraft pneumatic system. This goal, set eight years ago, has resulted in the development of the heart—the gas turbine compressor, and the muscles—the air turbine starter, air turbine motor and gas turbine motor.

▶ **Uniquely AiResearch**—Pattison listed these as AiResearch's unique contributions towards the development of practical, lightweight, efficient gas turbine power packages and motor units:

• **Inward-flow-radial turbine.** This wheel, basically similar to a centrifugal compressor with straight blades, is responsible to a great extent for the efficiency and simplicity of AiResearch's turbo machinery.

• **Variable-area nozzle.** Fitting hand-in-glove with the 90-deg., inward flow radial air turbine, the variable-area nozzle (or similar) feature is superior to fixed-area nozzles when a turbo machine is required to deliver constant power and/or constant speed (such as driving an alternator).

Variations in adiabatic head, caused by differences in inlet air temperature and pressure ratio, changes in altitude, etc., would impose severe operation restrictions on the equipment were the variable-area nozzle not available. The device allows the turbine to operate over an extremely broad range of inlet conditions with high efficiency, according to AiResearch. Added highlight is the property of quick stopping and direct reversing by reversing the nozzle vanes.

The area changing mechanisms, which modulate speed and power out-

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put of the turbine, may be two-position or infinitely variable, manual or automatic.

AiResearch cited still other attributes of the variable-nozzle principle. The machine's air consumption is considerably less than with the inlet throttle type. Moreover, it has a high overload capacity as compared to no overload capacity for the inlet throttle motor once the throttle is wide open. The principle is applied only to the company's air and gas turbine motors, not to the gas turbine.

AiResearch has developed two types of variable nozzles: the movable vane and the sliding ring.

Pattison said neither of these features were original AiResearch developments. However, the firm is the first to apply them successfully to actual, operating, airborne turbo machinery using a compressible fluid, he added.

▶ **Turbine Highlights**—AiResearch engineers found that the 90-deg. inward flow radial turbine was superior to the cantilever blade turbine for many applications, especially where high peripheral velocities exist and stresses become critical.

Wood pointed out that it is relatively simple to design and produce an engine which will supply compressed air in excess of turbine requirements. This air can be bled off to drive auxiliary equipment.

Wood stressed these operational, design and cost highlights of the AiResearch gas turbine compressor (GTC):

• **Backward curved wheel** for compressors. "We have managed to achieve, in our size class, higher efficiencies with the backward curve compressor than is usually considered possible for any shaft compressor," Wood said. Basic characteristic of the configuration is to provide a broad operating band in which the through flow rate may vary considerably while maintaining high efficiency. This is not true of the axial flow type of compressor, he said.

• **Wide gas turbine ambient temperature** operating range from —65F to +130F.

• **Adaptability** of one basic component to a variety of jobs. With only minor variations, the same unit may be used for either a bleed-off or shaft power compressor. (The first type furnishes power in the form of compressed air bled off the gas turbine, the second delivers power directly through a shaft.) Only change required is a slight modification of the gas passage through flow areas.

• **Ease of manufacture** (and consequent lowering of price) is assured because the turbine has a low number of blades, 12. These are straight, simplifying whatever machining is required. The exducer is a separate unit.

• **Efficiency** of the radial turbine is demonstrated by the fact that with a single stage it can do a job equivalent to 1½ 2 stages of an axial-flow turbine, Wood stated.

• **Dual bleed extraction** is a unique feature of the turbine. Relatively cool air (about 350F) may be extracted from the machine between the two-stage, centrifugal compressor and the combustor. If hot air is required (about 1,500F) it may be drawn off between the combustor and the turbine. A mixture of both to give 600-700F is generally used.

Example of the hot air application is to drive an air starter. Considerably more power may be derived from the same amount of air to drive the starter if hot air is used; result, more efficiency with no increase in size or weight of power source.

Aside from the fact that the manufacture of these turbines is compatible with current mass production techniques, Wood cited these additional advantages of AiResearch's turbo machinery:

• **Simplicity.** A single-stage radial turbine will handle most compressed air applications, avoiding the requirement for a large variety of turbine types. With simple blade contours, the machine will handle even higher pressure ratios per stage than a centrifugal compressor.

• **Reliability.** Thousands of hours of actual operation have proven the reliability of the design, AiResearch officials assert. Production wheels of commercially available metals now operate at 1,600F at speeds of 40,000 rpm.

• **Low cost.** Large-scale production may be achieved (and therefore low cost) by use of such manufacturing methods as precision casting and forging requiring little or no finish machining.

Maximum interchangeability of the machine's sub-assemblies was stressed as a design feature to give high simplicity to maintenance crews. These components are designed as separate mechanical assemblies capable of interchange between units. This feature involves a slight weight penalty, but AiResearch feels the maintenance simplifications far outweigh this minor drawback.

▶ **Complete Nacelle**—The engineering policy which dictated the final configuration of the GTC wrapped it up in a steel-and-aluminum envelope. Wood pointed out that the "nacelle design," bundling all components and controls of the GTC in a standard package, was done deliberately to avoid selling the customer bare units.

"Every powerplant installation 'nacelle' will have its own (often serious) troubles. Why go through this for every airplane?" Wood asked. He continued that a gas turbine is very sensitive to its installation, so that by selling

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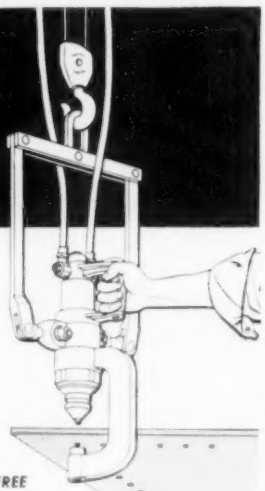

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The contents of AiResearch's complete nacelle, in addition to the basic gas turbine, are starter; tachometer generator; fuel pump; oil tank and cooler; fan to ventilate hot end and force air through the oil cooler; small generator pad, oil and fuel filters; ignition means; controls; and provisions for CO_2 discharge in case of fire.

▶ **Highly Automatic**—The GTC package obtains a high degree of automaticity. The unit is so rigged that a simple flip of a switch sets the entire machine in operation. The turbine starts automatically. Automatic controls take over the jobs of governing the machine's operation, protecting it from excessive overloads and monitoring tail pipe temperatures. Wood believes that no other auxiliary power unit has attained such completely automatic self-sufficiency.

Fuel consumption of the GTC is roughly 80 lb. per hr. at sea level.

▶ **Auxiliaries**—AiResearch currently offers these three turbine motors which can be driven by compressed air supplied by its GTC, bled off the main engines, or both:

• **Air Turbine Starter (ATS35).** Designed specifically for main gas turbine starting, this unit weighs only 17 lb., is rated at 35 hp.

• **Air Turbine Motor (ATM70).** Quoting AiResearch engineers, "This air motor is the first flight application of the variable-area nozzle turbine which is modulated by an integral pneumatic control to maintain constant rpm."

Developed to drive a 30-kva. aircraft type alternator at a constant 6,000 rpm., irrespective of electrical loads or air power supply, the unit is capable of maintaining constant rpm. from 5 to 150 hp. Normal rating is 70 hp. The 150-hp. overload capacity (when driven by main engine bleed air) indicates the potential and flexibility of the variable-area nozzle.

Weight of the entire unit, including controls and oil system is 57 lb.

• **Gas Turbine Motor (GTM125).** This unit burns bleed air for additional horsepower. Interesting feature is the combustion chamber, built around the turbine scroll to reduce scroll radiation losses to a minimum. Radiation from this housing helps to heat incoming bleed air for added efficiency.

The motor produces 125 shp. at 6,000 rpm. Lubrication, control and cooling systems are all self-contained. Total weight, dry, is 84.5 lb.

AiResearch also manufactures an transportable ground gas turbine com-

pressors to supply compressed air power and air transportable, air turbine motor-powered heaters capable of producing 4,000,000 Btu./hr.

Other models cannot be described because of security limitations.

► **Pneumatics**—AiResearch asserts that "pneumatic power is the only feasible single power source for supplying energy to all such major auxiliary loads in the aircraft as main engine starting, power for generating electricity, heating and air conditioning."

Flexibility of the pneumatic power package is illustrated by these facts: the accessory drives may derive their power either from main engines, auxiliary gas turbine compressor, or both.

The GTC is in itself highly versatile. It may be used as a ground unit, completely airborne unit, or as a removable airborne store. As an airborne store (either permanent or removable) it may be carried externally in a streamlined pod, internally in the wing or fuselage, or as an integral installation in the plane. As an airborne unit, it makes the aircraft completely self-sufficient from the point of view of engine starting at isolated bases or when waterborne, electrical and other ancillary power.

► **GTC Applications**—AiResearch lists these among the main airborne and ground applications of GTC:

• **Main engine starting.** An extremely lightweight installation, it possesses these advantages: unlimited starts and rapid recycling, soft torque characteristics, no initial shock loads and low overhang moment.

• **Electricity generation.** Lightness in weight, simplicity of motor and good constant speed characteristics recommend this application.

• **Ground air conditioning.** Air cycle refrigeration units, standard in most high-speed military aircraft, may be operated from the output of GTC to precool cockpit, ordnance, radio and radar compartments.

• **Ground heating.** Considerable heat is present in the compressor bleed. This may be augmented by passing bleed air through a turbine exhaust heat exchanger or by utilizing turbine exhaust heat and burning compressor bleed air. Used with a heat exchanger, the compressor is a lightweight, efficient combustion heater.

• **Taxiing power.** Quickly detachable units may be slung under wing to supply power for taxiing and engine starting during continuous alerts. GTC is removed at end of runway prior to takeoff.

• **Defrosting and preheating.** High Btu. output of GTC-powered multi-outlet heater speeds defrosting wing and tail surfaces and preheating engines in Arctic areas.

Still other uses of the power supplied by the GTC are: fog dispersal and runway lighting; smoke screen generation; assault boat and emergency shelter inflation; hospital tent refrigeration; power for portable, airborne hoists (as on helicopters); ground cockpit pressurization check.

The Garrett Corp.'s main Los Angeles plant is expected to turn out $8 million worth of products a month this year, while the newly opened Phoenix plant's output will soon reach $4 million. And a sizeable proportion of these totals will be turbo machinery.

Stratos Units Go in BOAC Coach Connies

Stratos cabin supercharger, made by the Stratos division, Fairchild Engine and Airplane Corp., will go into the five British Overseas Airways Corp. Constellations currently being converted to high density coach planes by Lockheed Aircraft Service, Burbank. Fifteen units were ordered.

The installation of the Model S-60 blowers in the British aircraft will resemble very closely the job done for Pan American World Airways 049 Constellations a year and a half ago.

The conversion was necessitated by the increased passenger capacity of the airplane. Old equipment could not supply enough air.

The Stratos supercharger will supply more air per passenger in the high density version than the original equipment did for the standard seating arrangement, says the maker.

DISPATCH OFFICE communicates with line mechanic to learn status of plane.

Radio Set-Up Relays Flight Status

A new method of keeping passengers informed about their flight status is a walkie-talkie installation just put into operation by Capital Airlines at Washington (D.C.) International Airport, where the carrier's main overhaul base is located.

Capital officials told AVIATION WEEK that the walkie-talkie setup is the forerunner of a plan, now in the formative stage, to make all its personnel conscious of the passenger and to keep him correctly informed concerning his flight. With the two-way radio, a mechanic actually working on the aircraft can relay up-to-the-minute information concerning its mechanical status to the flight dispatch office.

Another advantage of the walkie-talkie is that the mechanic can call the hangar for needed parts or tools, instead of walking for them.

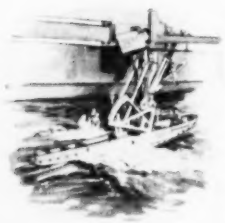
Layout includes a permanent installation on the ramp and desk sets in the flight dispatch office and the maintenance crew chief's office. Two mobile hand sets are provided for mechanics working on the planes.

The ramp set operates from two 6v. automobile batteries whose charge is permanently kept up by a timeclock-controlled motor-generator charging unit. Desk units operate on 115v. a.c. current.

Sets have a 5w. output, giving them a ½ mi. radius, according to the airline. Operating on an assigned frequency of 154.57 megacycles, the FM sets use the VHF spectrum. Call letters are KA9696.

Capital says this "is the first time an industrial frequency has been allocated by the Federal Communications Commission for such a use."

Seaplane research is bringing new phantoms to life in Stevens Tech's towing tanks, testing ground for the U. S. Navy Marlin's advanced hull design.



Delicately instrumented models prove today's dreams for tomorrow's air-sea power at the Experimental Towing Tank, Stevens Institute of Technology.

AN instrument-covered seaplane model knifes through the waters of a Stevens Tech towing tank. A Naval Bureau of Aeronautics researcher pores over plans for a jet-powered, swept-wing flying boat. A Martin engineer makes dreams take wings on his drawing board. And, step by step, planes that combine water-based mobility with land-based speed come closer to reality!

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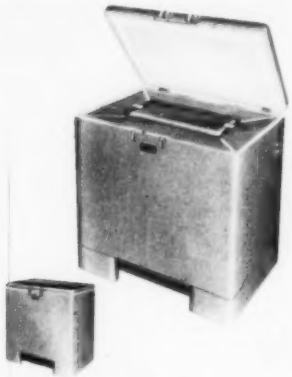


Arctic Outdone

A new cold chest capable of producing temperatures down to −95F for Arctic testing of metals and other materials, and for refrigerating parts to be shrink-fitted and similar applications, has been announced by its manufacturers, Revco, Inc.

The cabinet is equipped with non-settling, high density Fiberglas bats and has a "Sub-lid" to maintain constant temperature and minimize heat loss during use. Cabinet is of sturdy, all-steel welded construction.

Storage compartment in the unit measures 23x9x12½ in. Another model capable of reaching temperatures down to −85F has a considerable larger storage compartment. Its dimensions are 59x27x42⅝ in. Revco, Inc., Deerfield, Mich.

Gang Nut Fastener

A new gang channel multiple nut fastener, designed to speed aircraft assembly by eliminating in some applications the use of standard anchor nuts that must be secured in place individually, has been developed by Kaynar Mfg. Co., Inc.

The gang channel assembly is extra narrow, taking up no more space than a standard AN-366 anchor nut, says the company. In fact, it is narrower, lower in height, lighter and stronger than any similar product ever produced, the firm asserts. Further, it adds, small nut size allows closer center-to-center spacing than was possible before.

The channel is made of 24 ST aluminum alloy, features a double-vertical wall to insure that nut inserts stay moored and don't tear loose. The double wall also gives the channel maximum rigidity, reducing the amount of riveting required to attach it. Inserts are "Kaylock" spring steel high-temperature self-locking nuts, said to be substantially lighter in weight than most other self-locking, high strength nuts on the market.

They can be used over repeatedly, incorporate no auxiliary locking device. Utilizing all threads for load carrying, the nuts are made elliptical at their upper portion, then heat-treated to provide a strong, flexible threaded portion that resiliently grips the bolt.

Gang channels are available in various nut sizes, are supplied with either regular hole spacing or to special patterns.

The Kaynar Mfg. Co., Inc., Kaylock division, 820 E. 16 St., Los Angeles, Calif.

Coating for Acrylics

A quick-drying, synthetic coating that can be used safely on acrylic resin products, such as Plexiglas and Encite in aircraft, and is suitable for other applications, has been placed on the market by Necchi Protective Coatings, Inc.

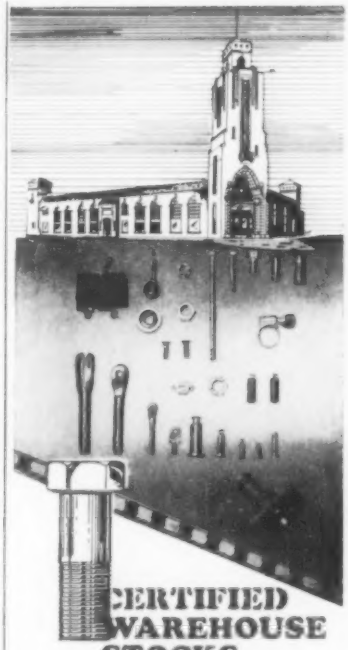
NE 108, as it is called, has been approved by the Air Force, the company says. Its strong point is that it can be painted on Encite and similar materials without crazing them. It produces an opaque surface and can be used, among other applications, to block off light in specific areas on illuminated panels, such as those which are used for aircraft instruments.

The product is the only one to date which meets military requirements, Necchi claims. Previous methods resulted in too many rejects, because drying cycle of the particular coating used was too long, the company explains. NE 108 solves this. It dries in minutes and three coats can be applied in short time.

Necchi Protective Coatings, Inc., 340 W. Hoffman Ave., Lindenhurst, N. Y.

Alcoa's B50S-O

A new aluminum coiled tubing, reportedly costing less than other strong tubing of the same metal and also



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copper products, has been placed on the market by Aluminum Company of America.

The product, called "Utilitube," is made of Alcoa's new B50S-O aluminum alloy, and beside general use is believed by the firm to have application in aircraft. Some features listed: easy workability, high fatigue strength, good flaring and forming characteristics, high resistance to vibration, corrosion and low temperatures. Utilitube's mechanical properties improve as temperature drops, even as low as −320F, says the firm.

It bends more easily than copper and work hardens less under repeated bending tests performed by the company show.

The tubing handles refrigerants with the exception of methyl chloride, is available in lengths of 1,000 ft. in coil form.

Also, Alcoa states, it can carry kerosene, and fuel and oil for internal combustion engines. It is suitable for air, vacuum and hydraulic lines for brakes and instruments, and cutting compounds for screw machines and lathes.

Aluminum Company of America, 683 Gulf Bldg., Pittsburgh 19, Pa.

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HOW TO HELP BRITAIN ...and Ourselves

The purpose of this editorial is to help Winston Churchill obtain the aid Britain needs

(1) to weather her present financial crisis, and

(2) to avoid a chronic recurrence of such crises.

This is not a philanthropic purpose.

Britain is our staunchest ally in the free world's continuing fight for survival. She cannot perform her role effectively if she is broke, or if she careens from one financial crisis to another.

Then, too, a nation such as ours—committed to private enterprise as a way of economic life—has a special interest in helping Winston Churchill to help Britain. His administration is relatively friendly toward private enterprise. Should he fail, he would be replaced promptly by a Socialist government more hostile than ever. And that would weaken the standing of private enterprise in the free world.

Cause of the Crisis

It is the drive of the Western World under our leadership to rearm against Russian aggression that has precipitated Britain's financial crisis. It set off a scramble for raw materials from which armaments could be made, and for many other materials that might be short in the event of war. So the prices of the things that Britain must import—mostly raw materials—have been boosted more than the prices of things she can export—mostly finished products. That leaves Britain short of funds to pay for essential imports. This difficulty increases as the necessity becomes more urgent to divert industrial effort from production for export to production for security.

The Basic Trouble

Although Britain's immediate crisis was touched off by the rearmament drive of the Western World, her basic affliction is one from which she has suffered since the end of World War II. Stated in its simplest terms, Britain does not produce enough goods to pay her own way as one of the family of free nations.

For years this deficiency in home production was made up by income from shipping and overseas investment. But Britain had to sell a large part of her foreign investments to finance her heroic part in World War II. So her income from that source has been greatly reduced. And, in spite of an increase of about a third above prewar in her own production of goods and—thanks to a continued "austerity" program—a much larger increase in her exports, Britain still is not paying her own way.

Two Ways to Solvency

Britain has two ways to restore her solvency. One is to cut down on what is consumed—the belt-tightening process. The other is to step up British production.

To surmount the present crisis, Mr. Churchill has asked for some cutting down. He probably must ask for more.

Except as a stop-gap expedient, however, more cutting down of Britain's consumption is clearly a dangerous course. That would further depress a British standard of living which, not more than half as high as ours, already is too low. Politically such a course would grease the skids for Winston Churchill's administration, even now governing by a wafer-thin parliamentary margin. Also, as *The* (London) *Economist* remarks, the "lazy expedient of cutting trade" would result in "hurting other people and forcing them to take similar action"—by cutting the market for their products.

The Only Cure

The best and, in fact, the only way to help cure Britain's economic ills is to help Britain produce more. Here the technical possibilities are encouraging. On the average, the British industrial worker produces only about 40 percent as much a year as the American worker. That is a British estimate, made by Sir Ewart Smith.

Wider use of better industrial methods and modern tools and an infusion of the competitive incentive into British industry — to replace the cartel and other restrictive practices — would go a long way to narrow this wide gap in worker productivity. This is the consensus of experts on both sides of the Atlantic.

Since 1948 the Anglo-American Council on Productivity has done much to encourage output per man-hour in Britain and to foster this doctrine with both labor and management. But much yet remains to be done.

In the United States it is increasingly suggested that before we give Britain any more economic aid we should insist that everything possible be done to exploit the technical possibilities of increased production. This emphasis on production is needed. But if we Americans were to impose upon the hard-pressed British people conditions that could be construed as an affront to a friendly and sovereign nation, we might well put into the hands of a masterful rabble-rouser such as Aneurin Bevan, the anti-American leader of the Labor Party's left wing, a campaign issue on which to maneuver himself into the Prime Ministership.

Churchill Can Insist

But Winston Churchill is not so handicapped as we should be in imposing prerequisites of further aid. As Britain's own, most honored leader he will raise no touchy questions as to Anglo-American relations if he insists that Britain have firm plans to cure her economic ills, plans sharply focussed on ways and means of increasing Britain's industrial efficiency.

By presenting a convincing plan to cure Britain's recurring crises through greater production, Mr. Churchill will greatly facilitate the process of getting the aid his country must have. He will also remove an increasingly dangerous element of dissension in Anglo-American relations – the feeling of many Americans that more aid to Britain is more money down the drain. The way to counter that feeling is to come up with a prescription for an economic cure, not a request for another economic poultice.

Technically, such a program is entirely feasible. It will perhaps be the supreme test of Winston Churchill's statesmanship to make it politically feasible as well.

In the interest of Britain, of the United States and of the whole free world, we wish him all success.

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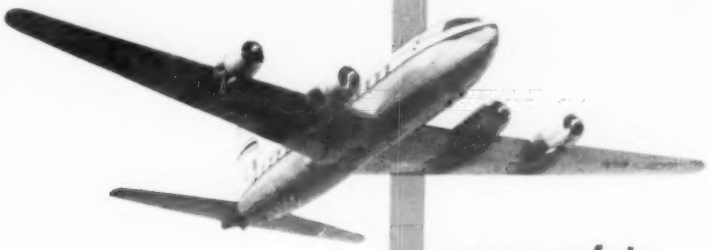
UP THERE WITH THE BIG NAMES...CHAPTER NUMBER 10



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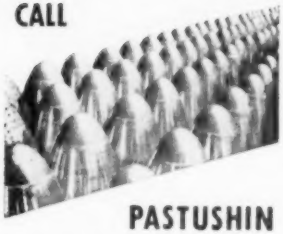

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CAB-Airline Clash Brews on Coach Fares

- **Board wants less than 4½ cents per mile day rate and 4 cents or less for night coaches.**
- **But companies operating non-competitive routes may oppose any reduction in established fares.**

By F. Lee Moore

A potential controversy is brewing between some airlines and Civil Aeronautics Board. It's over CAB's policy insisting on a coach fare cut from the present 4½ cents a mile—to less than 4½ cents on day coach, to 4 cents or less on night coach.

CAB expects all the airlines to announce coach fare reductions by Mar. 1, effective Apr. 1, when present rates expire. But several airlines, including Capital, Delta, Eastern and Northwest are reportedly unhappy about the CAB coach fare cut decree.

▶**Orders Reduction**—Capital Airlines already has found that CAB really means to slap a 4-cent-a-mile ceiling on night coach fares. Capital asked permission to start a New York-Atlanta night coach competitive with Eastern's at 4½ cents a mile. CAB answered that Capital could operate it at 4½ cents only from Feb. 1 to Mar. 1. After March, CAB said, Capital must cut the New York-Atlanta fare to conform with the CAB coach policy announced Dec. 6—meaning to 4 cents or less on this particular night coach.

Some observers interpret the Board answer to Capital as a definite tipoff that the Board may stand on 4 cents a mile as the absolute ceiling on night coaches. And it may mean all day coach operations eventually will have to come down, too.

Yet the Board has also felt itself compelled to put a new floor under coach rates, too. This happened when United first filed an $88 westbound, $99 eastbound New York-San Francisco rate. CAB objected to the "directional" feature of this fare. Then United filed a $99 fare both ways, same as TWA and American, but with a special low rate of $29 between New York and Chicago, compared with their $32.

▶**Suspends Lower Fare**—This was for United's DC-4 coach service. TWA then filed to meet the $29 fare with its DC-4s. This would have left DC-4 service at $29 and DC-6 and Constellation service at $32 New York-Chicago. CAB suspended the lower fare, objecting to the fare differential on type transports and apparently unwilling to let the DC-4 fare force American and TWA to lower their already-filed DC-6 and Constellation fares from $32.

So trans-continental coach fares have settled at $99, with $32 between New York and Chicago. CAB has shown it will limit coach fare competition to some extent, as well as force high fares down where competition doesn't force them down automatically.

So competition is the key to whether airlines voluntarily reduce coach fares or not. On competitive routes, one or more of the competitors is likely to follow the CAB fare cut policy, bringing his competition down to the lower rate with him.

But on non-competitive routes, some airlines may decide to protest the CAB policy. That's the question the airlines are trying to resolve now. Observers probably won't know the outcome long before Mar. 1—deadline for renewal applications on air coach rates.

▶**Competition Is Key**—Meanwhile, Eastern Air Lines is deliberating over National's proposed fare cut from $53 to $43 New York-Miami, for both night and day coach. This is 3.9 cents a mile non-stop, would be around 3½ cents a mile with the usual intermediate stops. This compares with the present 4½ to 4.8-cent fare.

This again demonstrates that CAB is probably not going to have any trouble getting airlines to cut fares on the competitive coach routes. Here is why the CAB worries over that possible prospect.

A top CAB official says the success of a fare reduction depends largely on promotion and sales effort put into it by the airline. Filling the transport to near-capacity (say 60-85%) on a scheduled flight is the chief requirement of success of a coach fare. CAB is anxious to have the airlines back the fare cuts with enthusiastic promotion; where an airline doesn't do this, some fear the service may turn out a money loser.

One official cites United's New York-San Francisco coach "experiment" as an example. United started it to "satisfy" CAB and charges the passenger who misses a coach flight the entire cost of his ticket if he doesn't present his ticket for refund within three hours before plane time, while competitor TWA doesn't charge customers anything for failure to make a flight. One possible result of this type promotion is that TWA's New York-San Francisco DC-4 has averaged 44 passengers per flight since its start Oct. 1; United's has averaged 37 passengers.

TWA vs. United New York-San Francisco coach competition their first three months stacks up this way, on load factors October, November, and December, with United using 66-passenger DC-4s and TWA 60-passenger DC-4s:

- **TWA.** 67%, 72% and 80%.
- **United.** 52%, 51% and 64%.

But observers point out that United is just getting started in the trans-continental coach market.

▶**Coach Expansion**—Meanwhile, equipment conversion to coach density is the chief problem of airlines in planning air coach expansion—also urged by the CAB policy. An American Airlines official points out that an airline has to take a plane out of service about two weeks to convert it to coach seating. In readying its doubling of trans-continental service by June, American has had to yank a New York-Detroit flight temporarily, causing not only revenue loss but squawks from the area affected.

Another example is National's DC-4 conversion program. National Airlines this month ran into a production planning problem on converting all its DC-4s to 69-passenger coaches. National had asked CAB permission to start $43 New York-Miami coach service Feb. 1; but because CAB refused to give advance notice whether it would approve or not, National says it has now decided it must delay the new coach service to Mar. 1 or Mar. 15.

Meanwhile, Pan American has solved the conversion problem by ordering a whole new air coach fleet of 29 DC-6B transports direct from the Douglas factory. First nine are expected in time to start trans-Atlantic coach service May 1, without a hitch in current scheduling. The rest will come along in later 1952 and 1953.

▶**CAB Urges Short-haul Coach, Too**—Short-haul coach is CAB's next project.

now that the domestic airlines are moving gradually into air coach expansion, and Pan American has gone all the way on trans-Atlantic coach plans.

An American Airlines official says almost every time he talks to CAB people they ask him "when are you going to start a short haul coach shuttle?"

And Consolidated Vultee engineers are elbow-deep in design studies of possible coach configuration Convair Liners to carry 60-65 passengers over short hauls.

They are even considering putting the Wright 3350 engine on them to haul the heavier load. They claim the problem is going to be gross load, not square feet of floor space. They get considerable added space by yanking the galley and the luggage racks.

▶ **All-Coach Airlines?**—One high CAB official has told AVIATION WEEK he would like to see one of the smaller airlines convert its entire fleet of postwar planes to air coach seating. He made the following points in favor of such a program.

- Smaller airlines get into fleet utilization problems when they have part of their planes coach and part luxury. It's hard to get scheduling flexibility that way.
- Smaller airlines have shorter routes; on short hauls, passengers don't need free meals and other personalized service and they don't need much leg room or lounge space. Service and leg room are the chief differences between coach and luxury (standard) transport.

Therefore, he says, why not convert an entire small fleet to coach, thereby hauling more people and broadening the economic base of the airline's patronage.

Senate Committee Hits Air Coach Policy

Senate's Small Business Committee disapproves Civil Aeronautics Board's plan to let the scheduled airlines develop air coach—and is going to keep saying so.

In its annual report just released, the committee commented on CAB's air coach meeting with scheduled airline representatives:

"Those who had pioneered coach travel were not in the Board's plans for expanded coach service. In fact, the Board's apparent policy was to drive the independent carriers out of business through economic measures since it had failed to eliminate them through regulations.

▶ **Cites UAL Case**—"The head of one of the major airlines, W. A. Patterson of United, made this strategy clear in announcing that United would offer coast-to-coast air coach service for $88 eastbound and $99 westbound. United's full transcontinental fare is $157.85. Its coach flight, inaugurated only in September, 1951, has been charging $110. 'If the air coach boys drop their fares any lower, we'll go right down the scale, dollar for dollar, with them.' He later stated that he would not be going into the air coach business if it were not for 'political criticism.'"

It's a "clear example," the committee said, of "a government agency overruling the natural economic forces at work and eliminating the opportunity for new enterprises to come into the field by creating in effect a new product or service. . . ."

▶ **Carriers Reluctant**—Furthermore, the committee is skeptical there will be any "substantial increase in coach service by the large certificated carriers":

"Existing equipment is in full use. New equipment will mean a long wait. Airline officials have expressed privately a reluctance to convert existing luxury aircraft into coach-type planes.

"Aside from the fact that this program will not provide in the immediate future the promised low-cost service, the committee is concerned with the more fundamental problem of the implied grant of a perpetual monopoly to the existing large carriers of any new development in air transportation. . . ."

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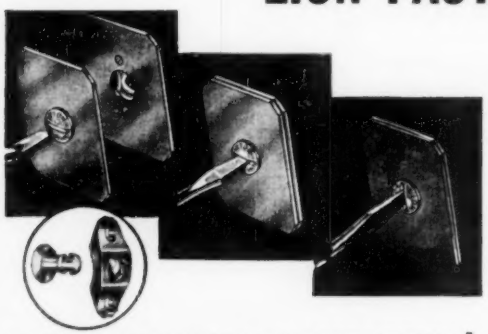

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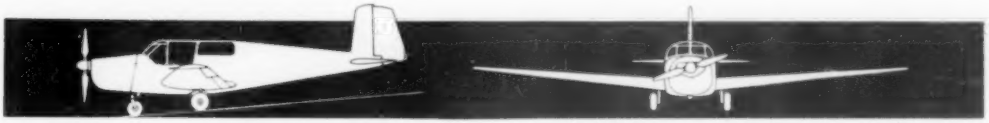
Indicating the confidence placed in Saab products is the recent order for *Safir Trainers* from the Royal Swedish Air Force. Designated Saab-91 B, this trainer is a development of the Saab Aircraft Company's well-known *Safir* 3-seat all-metal tourer.

Faster and sturdier than its predecessor, thanks to the more powerful Lycoming O-435-A "flat six" engine now fitted, the new *Safir Trainer-Tourer* is equally suitable for military and civil training, and as a personal aircraft. Notable features of the *Safir Trainer-Tourer* include: long flight duration (more than four hours), tricycle landing gear, dual instrumentation, and a new Hartzell variable pitch propeller.

Now being produced under Saab contract at Dordrecht, Netherlands, by the Aircraft Division of the De Schelde shipbuilding company, the *Safir Trainer-Tourer* offers an outstanding combination of trainer efficiency and "big plane" safety.



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More Flight Aids

- **Better code, more voice identifiers are planned.**
- **But expenses involved will delay program.**

The CAA with Air Transport Assn. cooperation, is laying out a two-phase program to improve identification of navigation ranges, instrument landing systems, fan markers and compass locators.

First, the code identifications of the various aids are to be made distinguishable from other aids. Second, a step-up in installation of voice identifiers beside the code identifiers is programmed, but promises to be long and expensive. However, authorities agree the changes should be made, as all aids of an area have carried the same identities; pilots have occasionally flown one type aid believing it to be another.

▶**Code.** Here's the current program on Code Identity Improvement:

• **VAR ranges.** CAA is adding a "V" (. . . —) to the code identification letter of VAR ranges. Thus, Largo, Md., will now be VLOD instead of just LOD.

• **Instrument landing system.** No overall plan is formed for ILS identification change yet, but CAA is adding the letter "I" to identification letters of one ILS installation in each region, experimentally, at Memphis, Chicago, Oakland, Kansas City, Los Angeles and Seattle.

• **Fan markers.** CAA is experimenting with new speeds on the fan code signals to make the two types of markers more distinct. As they are now, the periodically sounded one-dot identity of one fan can sound like the four-dot identity of the other.

▶**Voice.** Here's the plan to date for the more expensive program for adding voice identity to the regular code identifiers.

• **VOR ranges.** The old CAA-budgeted program was for 40 stations to be converted with fiscal 1950 and 1951 funds. But only a few have been modified to send voice identity because the appropriations came through late and deliveries are delayed also by the war.

Long Beach, Oakland, Salt Lake City, Boston, and Caldwell, N. J., now have voice identity; the rest of the 40 may be in by June 30.

All new VOR ranges procured recently and those to be produced from now on will also have voice identity.

The remaining 300-odd ranges will be converted as funds come through. Cost per unit for adding voice to existing unit is around $3,000-4,000 each. But CAA and the airlines feel there must be a cheaper system than the Collins, now used.

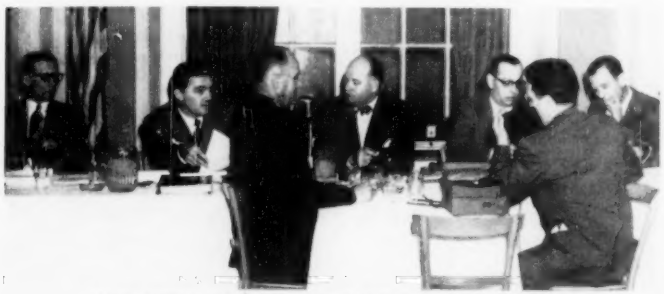
• **Fan markers.** Plans to convert 19 fans by June 30 may be increased later. Airlines and the military are urging CAA to divert enough additional funds from other 1952 CAA projects to install 20 more voice identifiers at fan markers in congested areas. Three are already operating now at La Habra, New Rochelle and Smyrna.

• **Compass locators.** Voice identity is planned for eight outer marker compass locators. LaGuardia and Los Angeles are already operating.

▶**Problems**—Money is the biggest problem in the voice identity program. But there are some knotty technical problems, too.

Modulation of the voice identity at some stations makes the cockpit's middle and inner marker lights flicker.

Another attack on this problem is to get a man's voice that doesn't modulate in a way to affect the marker lights. But this varies with the word series for identity of the particular marker; so different voices sometimes have to be used for different identities. Both CAA and Collins Radio are experimenting with these problems and expect to solve them without much trouble.



CAB GETS FACTS IN ELIZABETH C-46 CRASH

Robert W. Duff, president-general manager of Miami Airlines (third from left) testifies before panel of CAB Bureau of Safety Investigation members sitting in the Elizabeth-Carteret Hotel, N. J., on the crash of a Miami C-46 Commando Dec. 16, which killed 56. Left to right, E. N. Townsend, chief, technical division; J. O. Fluet, chief of Region 1, N. Y.; Duff; R. W. Chrisp, presiding officer, chief, hearing and reports division; H. G. Crowley, principal reports writer, hearing and reports division; stenographer; and CAB Executive Director James M. Verner, who came up unexpectedly from Washington to attend the hearings. Other Board representative, W. K. Andrews, director, Bureau of Safety Investigation, is not included in this photo. Some 60 witnesses were heard during the three-day hearings. A probable cause of the crash was a failure in the bottom, front-row cylinder in the right engine, resulting in an intense fire, which may have caused wing spar to bend sufficiently to seriously affect control of plane. It is believed the C-46 was loaded close to its 48,000-lb. allowable gross weight, and with gear down may have stalled trying to return to Newark Airport.

Muffler Preview Indicates Noise Cut

A preview demonstration last week at Teterboro Air Terminal of Aero Sonic Corp.'s noise muffler for large transports indicated that the Brooklyn manufacturer's unit can do a good job in cutting plane noises (AVIATION WEEK Dec. 10, p. 15).

Congressmen and Washington Civil Aeronautics Administration officials who witnessed the demonstration noted that the device did apparently reduce the operating noise level.

Albert Forte, a CAA observer, felt there was a decided cut in noise, especially at takeoff and when the plane started to climb, two points where noise is usually greatest. Forte said that "noticed harshness of the noise was considerably reduced," and vibration on the body was lessened.

▶**Decibel Readings**—Total plane noise at climb was reduced 50%, on the basis of readings from a decibel meter on the ground, New York Testing Laboratories told AVIATION WEEK. The services of this firm were provided at the demonstration by Aero Sonic.

R. G. Baker of New York Testing Labs says there is evidence that the muffler has "a selective damping effect," damping out frequencies that cause people the most discomfort. These are the frequencies, Baker says, that penetrate the walls of houses most easily.

▶**Meteor's Part**—The two C-46s used in the test were provided by Meteor Air Transport, an airfreight-passenger contract carrier based at Teterboro. The two planes flew over at 200-ft. altitude with engine controls at full power climb conditions. The craft were powered by Pratt & Whitney R-2800s. CAA agents flew in both planes to make sure operating conditions were the same.

The muffled plane had square-tipped prop blades, generally conceded to be quieter than round-tipped blades, such as those mounted on the unmuffled plane. Meteor could not get identical props for both planes in time for the preview. But observers felt most of the credit for the quieter operation was due to the use of the muffler.

A full-scale demonstration was slated later in the week for airline observers, aviation groups, civic anti-noise committees, representatives of the armed services and of various government agencies.

DPA Paves Way For Tax Write-Offs

Airline applications for rapid tax write-off certificates for planes and spare parts will now get priority handling Defense Production Administration has announced.

And American and TWA already have received the first tax write-off certificates granted by DPA for airliners.

These two DPA actions pave the way for al lthe airlines to save some money on new equipment through accelerated tax amortization.

▶**Two Weeks' Notice**—The DPA has revised its whole system of priority processing of tax write-off applications by defense and defense-supporting industries. It has listed 14 priority industries, including air transport, whose applications shall be processed with special but equal speed.

Also, DPA says it will soon issue new operating regulations for granting such certificates; DPA will give two weeks' notice before making the new regulations effective.

An offical observer says that after a recent meeting with DPA on tax write-off applications, he got the impression that airline applications now before DPA would be processed by the end of this month.

▶**The Results**—The American Airlines application for accelerated amortization on five Convair-Liners was the first air line application acted upon, as was expected in industry circles. DPA granted rapid write-off for 80% of the certificated amount of $2,603,554. American applied for $2,613,636.

The Trans World Airlines Kansas City office last week was notified that on its total application covering over $50 million of planes and spares, DPA granted as follows: planes and spare parts acquired before Sept. 23, 1950—60%, except for 25% of spares denied completely; planes and spares acquired thereafter—80%.

Fuel Aid Is Claimed From New Catalyst

A synthetically compounded catalyst composed of naturally occurring minerals and cast in the cylinder head of an internal combustion engine was described last week by its Russian-born inventor, Dr. Sophia Berkman, as promising greatly improved engine performance.

Dr. Berkman said tests "have demonstrated improved performance of gasolines equivalent of up to 25 octane numbers." The catalyst also promotes more complete combustion, according to the inventor, and inhibits formation of carbon deposits.

▶**Comment**—Reactions to announcement of Dr. Berkman's discovery ranged from incredulity to skepticism. Some top men in the field questioned whether the product could perform all the jobs claimed for it, withstand the rigors of heat and pressure inside a combustion chamber, and remain active for any appreciable length of time in the face of attacks by such destructive agents as sulphur and other deleterious ingredients always present in a combustion chamber.

But Robert S. Wallach, President of Associated Development and Research Corp., 150 Broadway, New York, which sponsored the press conference at which the claims were made, said tests in C.F.R. (anti-knock test) engines had been conducted over a year's period and totaled about 1,000 hr. running time.

The synthetic ore catalyst purportedly reacts on the fuel-air mixture when it enters the combustion chamber, with some properties promoting "completeness of combustion while others retard the combustion rate and thus prevent knock. Still others are included to take care of particular reactions in gasolines of different specifications."

▶**Life and Cost**—Wallach said the life of the catalyst could be expected to exceed that of the engine carrying it. To include the catalyst in an average automobile engine, he estimated, would cost between $30 and $40, the cost of the catalyst itself being a nominal $1. No critical ores are contained in the catalyst's makeup, he said, the primary ingredients used in it being silicates and oxides.

THIS IS HOW THE DOUGLAS DC-7 WILL LOOK

Douglas Aircraft Co.'s DC-7 will look much like the DC-6, according to this artist's conception just released. Company's Santa Monica division is at work on the first of 25 DC-7s ordered by American Airlines for coast-to-coast service early in 1954. Company says that the new plane's 400-mph. top speed and 360-mph. normal cruising speed—50 mph. faster than the DC-6—will make it the fastest in the series of Douglas transports. It will also be the most powerful, drawing 13,000 hp. at takeoff from four Wright Turbo Compound R-3350 engines. Props will be four-blade Hamilton Standard units with diameter of 13 ft. 6 in. Douglas says the DC-7 is eight feet longer than the DC-6, and will accommodate 60 passengers normally, or 95 in air coach version.

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CAB Sets Causes In 2 Fatal Crashes

Confusion of radio navigation aids probably caused major fatal crashes involving planes of two of the world's leading airlines, it is revealed by recent Civil Aeronautics Board accident investigation reports.

These are the Pan American Constellation crash fatal to 40 at Monrovia, Liberia, June 22, 1951, and the United Air Lines DC-6 crash fatal to 50 at Fort Collins, Colo., eight days later (analyzed in AVIATION WEEK, Oct. 29, 1951, p. 63).

▶ **Monrovia, Liberia:**

The board summary of the Monrovia crash states probable cause as "the action of the captain in descending below his en route minimum altitude without positive identification of the flight's position." However, in the body of the report it is noted that:

• **Another nearby radio beacon,** Dakar, was interfering with and over-riding the Roberts Field beacon the pilot used for the fatal PanAm instrument approach. "As a result of this and previous reports of interference from Dakar, the frequency of the Roberts radio beacon was changed. . . ." the CAB report states.

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BELL *Aircraft* CORPORATION

• **As a result of a survey** of the navigation aids at Roberts Field after the crash, CAA restricted operations to VFR approach in daylight.

• **Subsequent improvement** in the Roberts Field facilities (operated by Pan American) resulted in this restriction being removed "except that all night operations are to be in accordance with IFR rules."

• **Previous procedure** permitted by PanAm operations had reportedly allowed shortcutting standard instrument approach procedure at this field. This was changed after the accident.

▶ **Fort Collins, Colo.:**

CAB summary of the Fort Collins crash states probable cause this way: "For reasons undetermined, pilot failed to follow the prescribed route to Denver and continued beyond the boundary of the airway on course which resulted in the aircraft striking mountainous terrain." However, the report mentions two possible hypotheses to explain the pilot's confusion of the navigation aids.

Most widely held theory is that the two identically laid-out Denver ranges with same identity codes were a potential booby trap since quadrant signals are opposite.

If the pilot tuned the ADF a little off the Denver frequency, he might bring in some of the Fort Bridger, Wyo., frequency, conceivably causing his ADF compass needle to lead him into the mountain off course.

Most significant remedial actions taken by the airline and CAA after the crashes reported in AVIATION WEEK Oct. 29 are:

• **CAA changed identity** of the VAR range at Denver to VDEN, to distinguish it from the parallel DEN low frequency range.

• **United changed the switches** on its DC-6 audio selector panel to make the VAR switches distinguishable from the VOR and LMF switches.

• **United increased** pilot training, "with particular emphasis on maintenance of route and equipment qualification."

Rentzel in New Job

Former Commerce Under Secretary Delos W. Rentzel has joined W. R. Grace and Co. as vice president of technical supervision over Grace's far-flung industrial operations. This includes mines, plantations, banks and other enterprises, mostly in Latin America. It excludes air transport, which Rentzel says he won't be interested in directly for several years in his new job.

Rentzel formerly was president of AirInc (an inter-airline avionics company), then CAA administrator, CAB chairman and Commerce Under Secretary, before resigning recently. Before all this he was with American Airlines.

DeLoss K. Martin (right) is sworn in by CAA Administrator Charles F. Horne.

ANDB Gets New Technical Director

The Air Navigation Development Board, assigned to coordinate avionics development of Air Force, Army, Navy and CAA, is reviving, after six months' reduced activity. DeLoss Kellogg Martin has been sworn in as technical director by CAA Administrator Charles Horne. Martin succeeds former director Douglas Ewing, who submitted his resignation last March and left with most the technical staff last summer. Defense Dept. had previously approved Martin's appointment.

Martin comes from Bell Telephone Laboratories, where he was a specialist in airborne communications equipment. He is expected to spend some time on the job before taking any strong positions on navigation and traffic control development. He plans to add two new avionics experts to the development staff, perhaps more, depending on budget and other circumstances.

Meanwhile, ANDB has awarded a contract for the pre-production model of data display and transfer equipment —one of the first major development steps toward modernizing traffic data transfer. Contract goes to Union Switch and Signal Co., marking the entry of a second railroad signal company into air traffic control business. (General Railway Signal Co. has had previous contracts with civil and military aviation agencies.)

This contract is a part of the ANDB-developed overall traffic control plan including: magnetic drum for storing flight plan information (under development by Engineering Research Associates); data display and transfer equipment for this and other information (the new Union Switch contract); and a switching system for getting messages to appropriate air traffic control offices at the time needed (contract still to be let).

(The "Shortlines" column will be found on page 76 of this issue.)

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130	8288	Follower Ass'y
814	35814	Blower Ass'y
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175	48363	Shaft
56	48399	Sump
390	48461	Gear
78	76236	Gear
1178	84289	Bearing
183	84487	Housing
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7000	18KD4
6600	RE3MR3
5000	F35-14

LEAR ACTUATORS AND SCREW JACKS

Quantity	Part No.
42	400AJ3
161	420 EC
160	420 DY
26	550 CD
14	550 CG
195	550 CP
194	550 EC

OIL COOLER ASSEMBLIES

Quantity	Part No.	Mfg.	Description
45	AN4103-2	Clifford	Brass (Valve # U4785)
18	18597-2	Airesearch	Aluminum (Width 8") Length 9")

PUMPS

230	MF9-713-15A	Vickers	Hydraulic
160	2E492E	Pesco	Fuel
700	TFD-8600	Thompson	Fuel Booster
125	D7818	Adel	Anti-icer
50	2P771-A	Pesco	Fuel Booster
250	AN4014	Erie Meter	Wobble (D-1)
300	1H960-K & KA	Pesco	Hydraulic

INSTRUMENTS

10	AN5531-1	G. E.	Tach. Generator
1000	AN5780-2	G. E.	Wheel & Flap Position Indicator
400	AN5780-2	Weston	Same as above
16	76B19	Lewis Eng.	Cyl. Head Temp.
10	46B2	Lewis Eng.	Air Temp. Ind.
31	47B21	Lewis Eng.	Temperature Ind.
19	47B22	Lewis Eng.	Temperature Ind.
20	47B23	Lewis Eng.	Temperature Ind.
36	47B24	Lewis Eng.	Temperature Ind.
10	76Z2	Lewis Eng.	Air Temp. Ind.
11	76B4	Lewis Eng.	Temperature Ind.
20	77C4	Lewis Eng.	Temperature Ind.
21	77C5	Lewis Eng.	Temperature Ind.
85	727TY72Z2	Weston	Left Wing Anti-icing
88	727TY73Z2	Weston	Right Wing Anti-icing
83	727TY74Z2	Weston	Tail Anti-icing
11	2227-11D-3A	Eclipse	Dual Tachometer
22	8DJ-29-AAY	G. E.	Indicator (Cowl Flap)
45	254BK-6-052	Kollsman	Differential Pressure Ga.
25	906-6-011	Kollsman	Dual Altimeter and Differential Pressure Ga.
5	14601-1G-B1	Eclipse	Attitude Gyro
22	15100-1B	Eclipse	Pitch Trim Ind.
10	20000-8A-14	Eclipse	Magnesyn Position Ind.
23	20100-11C-4-A1	Eclipse	Magnesyn Wing Flap Ind.
40	2300-9A	Eclipse	Position Transmitter
25	46N2	Jaeger	24 Hour Clock

MISCELLANEOUS COMPONENTS

44	5BA25DJ4B	G. E.	DC Motor (1/4 HP)
83	A4934	Delco	Motor
50	RDB2220	Holtzer Cabot	DC Motor
49	FD65-5	Diehl	Motor
47	FD65-6	Diehl	Motor
116	A371205	Dumore	Motor
780	A371206	Dumore	Motor
115	P4CA2A	Parker	Primer
80	AN3913-1	Scintilla	Ignition Switch
450	A-9 (94-32296)	Nasco	Ignition Switch
687	RS-2	Mallory	Selector Box
90	JH950-R	Jack & Heintz	Starter Motor
492	S-841 (94-32953)	Electronic Labs	Box
53	AN6203-3	Bendix	Accumulator 10" 1500 P.S.I.
1000	13018-A	Bendix	Interphone Box
140	K14949E	Marquette	Winshield Wiper Kit
188	EYLC-2334	Barber-Colman	Control
11	12086-1C	Eclipse	Amplifier
174	450-0	Skinner	Gasoline Filter
950	558-1A	Eclipse	Oil Seperator
100	716-3A	Eclipse	Generator (NEA-3A)
37	117-47	Edison	Detector
89	318	Edwards	Horn
280	921-B	Stewart-Warner	Heater (200000 BTU)
340	981280	Kidde	Co2 Cylinder
85	12924-2	Adel	Lock Valve
90	923748	Kidde	Oxygen Cylinder
80	DW28	Eclipse	Transformer
97	6041H-146A	Cutler Hammer	Relay (B-12)
22	0655-D	Aro	Oxygen Regulator
22	M-2031	Air Associates	Actuator
148	PG208AS1	Minn. Honeywell	Air Ram Switch
33	DW47	Eclipse	Transformer
11	DW33	Eclipse	Transformer
65	ASDC2	CO2 Mfg. Co.	Fire Detector
750	ND21	American Gas Accumulator Co.	Time Delay Relay
30	U6005-DV5	United Air Prod.	Oil Temp. Reg. 5"
29	UA-3160	United Air Prod.	Oil Temp. Reg. 6"
95	UA-3160C	United Air Prod.	Oil Temp. Reg. 6"
73	UA-6007-CF-DV5	United Air Prod.	Oil Temp. Reg. 7"
14	UA6009-S-30	United Air Prod.	Oil Temp. Reg. 9"
11	UA-6012K-S30K	United Air Prod.	Oil Temp. Reg. 12"

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WRITE—WIRE—PHONE

COMMERCIAL SURPLUS SALES CO.

4101 CURTIS AVENUE, BALTIMORE 26, MARYLAND

TELEPHONE: CURTIS 3300

SHORTLINES

► **Aer Lingues** reports a record 270,000 passengers carried in 1951, 21% more than 1950. Cargo gained 46% to 3,800 tons.

► **Air Line Pilots Assn.** office and professional workers vote this month on what union, if any, shall be their bargaining agent vs. ALPA's union management.

► **Air Transport Assn.** reports interline traffic business transacted through the airline clearing house gained 36% in November over '50, to $25,258,243.

► **American Airlines** is trying pre-clearance by U. S. customs of Canadian passengers in Toronto. Trans-Canada has also started it. . . . American reports that "never had an air carrier moved so much so smoothly" as did American during the Christmas rush using its new "cargo control" system for handling air freight.

► **Braathens S.A.F.E.**, independent Norwegian airline, has ordered two Lockheed 1049 Super Constellations for Far Eastern service.

► **British European Airways** is converting its 49 Viking transports to be readily adaptable to five different types of service: luxury for 24 passengers, less luxury for 27, less yet for 34, tourist service for 38, and two-class service for 12 tourists and 15 luxury.

► **British Overseas Airways** starts a special roundtrip rate to Portugal at 12 pounds under regular fare Apr. 1. . . . Reports its 10 Stratocruisers flew 5,520,619 miles in 1951, up 53% from their 1950 performance.

► **California Central Airlines** reports a record of 16,707 passengers carried 4,625,786 passenger miles December on its all-coach service. The non-subsidized intrastate airline credits its 44 passenger Martin 2-0-2s for most of the gain. They started operation four months ago for the airline. . . . Total 1951 traffic totals 145,105 passengers carried 41,245,825 passenger miles, gains of 55% and 43% respectively.

► **Civil Aeronautics Administration** regional agents report they found eight nonscheduled airline C-46 safety violations of maintenance and operations regulations during the intense three-day check-up. There were 331 individual inspections.

► **Civil Aeronautics Board** plans to suspend or revoke another nonscheduled airline's letter of registration any day. Last two, Air Transport Associates and New England Air Express, won court orders staying CAB action.

► **Defense Air Transportation Administration** has assigned a task study group under Emery Air Freight Corp. president John Emery to look into freight forwarders' role in mobilization.

► **Eastern Air Lines** and American have been awarded 1951 certificates of "management excellence" by New York's American Institute of Management—both for the second time. Some 296 other firms of the U. S. and Canada also won the award.

► **Honolulu Airport** overseas operations doubled in the year ended June 30. Hawaii Aeronautics Commission credits the Pacific lift for this. Fuel tax collections correspondingly doubled to $1,135,080, and other collections to $427,633.

► **Mid-Continent Airlines** will keep its Sioux City-Chicago local service route. CAB has decided in the North Central route investigation case. But CAB is transferring MICA's Twin Cities-Chicago operation to local service airline Wisconsin Central. CAB Member Josh Lee dissented, saying both local routes should go to local lines.

► **Mid-West Airlines** would get a three-year renewal of its certificate if CAB follows the recommendation of Examiner James Keith. CAB has already approved the purchase of Mid-West by Purdue Research Foundation, so outlook is for quick CAB renewal.

► **National Airlines** December traffic gained 54% over a year ago and 28% over Nov. . . . 1951 traffic rose 58% to 436,774,000 passenger miles, with available seat mile gain of 35%. Result: Average load factor for the year gained nine points to 62%.

► **Northwest Airlines** dispute with its AFL machinists has gone to a Presidential Emergency Board, reported partly because of its potential effect on the Pacific lift.

► **Ozark Air Lines** has bought a Philippine Air Lines DC-3, bringing fleet total to nine. . . . Is moving its entire operation to Lambert Field, with the heavy maintenance equipment moving from Parks Airport to the Missouri National Guard hangar at Lambert.

► **Slick Airways** reports a record 67,900,000 ton-miles cargo traffic for 1951, keeping its lead as biggest cargo airline. This is almost 50% over Slick's 1950 cargo traffic.

► **Trans-Canada Air Lines** has taken over control of its own purchasing business, previously handled by Canadian National Railways. Howard C. Cotterell, general manager of purchases and stores, is in charge.

► **TPA Aloha Airline** Dec. traffic gained 48% over a year ago to 138,676 passengers.

WHAT'S NEW

New Publications

Publication B-13, Anaconda Welding Rods and Procedures gives data on copper and copper alloy welding rods also has applications and procedures for production and repair welding and for building up worn surfaces with bronze rods. **Publication B-15** gives physical constants and properties of 46 free cutting and general purpose rods, also has applications and pictures convenient weight tables and conversion factors plus a chart for balancing material costs against production costs. **Publication B-3** suggests cutting speeds, feeds, tool rakes and clearances to be used on more than 40 different copper alloys. For any of these bulletins write American Brass Co., Waterbury, Conn.

Telling the Market

A Guide for Selling to the United States Air Force, a revision of **Follow Me**, originally published in 1949, gives pertinent business information slanted to small firms, such as how to get on USAF's bidders' list, different types of Air Force contracts and the service's different methods of distributing specifications to potential contractors. There is also a listing of all AMC district and regional offices. Write Air Materiel Command, Wright-Patterson AFB, Dayton, Ohio, Attn.: MCPAXC-1, or Air Force regional procurement offices.

Rapid Identification (Spot Testing) of Some Metals and Alloys outlines simple procedures that can be used in the lab or in the shop. An insert details methods of identifying metals for scrap salvage. Write, Development and Research division, International Nickel Co., Inc., New York 5, N. Y. The same company also has available an eight-page folder describing an **inoculant**, metallurgically designed to improve machinability, add toughness and increase resistance to wear. Write International Nickel, Dept. EZ, New York 5, N. Y.

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LOCKHEED AIRCRAFT CORPORATION

Georgia Division **Marietta, Georgia**

has immediate and near future openings for qualified and experienced men of high caliber to fill positions of:

FLIGHT LINE FOREMEN

(At least 5 years supervisory experience in Production Flight on large aircraft)

ASSEMBLY FOREMEN and SUPERVISORS
MOCKUP FOREMAN and SUPERVISORS

Reply stating full qualifications and when available to:

MR. FRANK J. JOHNSON
Employment Manager,
594½ Peachtree St., N. E. Atlanta, Georgia

KAISER
METAL PRODUCTS
Formerly Kaiser-Fleetwings
Bristol, Penna.

• This company which has pioneered in Aircraft Design and Development for 20 years, is now expanding its Aircraft Division and offers unusual opportunities to high caliber, experienced—

AERONAUTICAL ENGINEERS

—who are interested in growing with a rapidly expanding organization, devoted to Design and Development in Aircraft, Aircraft Armament and Related Components.

DESIGN ENGINEERS and DRAFTSMEN

- Airframe
- Power Plant
- Equipment
- Electronics
- Instrumentation

SR. STRESS ANALYSTS
CHIEF CHECKER

To set up and supervise aircraft design checking group.

CHECKERS
STANDARDS ENGINEER

To exercise control over Drafting and Engineering Standards and Specifications.

MATERIAL ENGINEER

To coordinate material and equipment requirements on major aircraft projects.

TOOL PLANNERS
TOOL DESIGNERS

Experienced in Aircraft or Allied Fields.

PROCESS ENGINEERS

Experienced in Writing Aircraft Process Specifications.

PRODUCTION ENGINEERS

To provide liaison & coordination between Design, Tooling & Mfg.

CHIEF METHODS ENGINEER

To set up and supervise methods group. Aircraft background essential.

CHIEF COST ESTIMATOR

To supervise Estimators in Aircraft Projects.

TOOL ENGINEERS

Extensive Aircraft Experience Required.

• Qualified men who can fill the listed positions are urgently requested to contact our Employment Manager at—

KAISER
METAL PRODUCTS
Radcliffe St. Bristol, Pa.
PHONE: BRISTOL 3361

LETTERS

Scare Headlines

The only thing wrong with your ad in Editor & Publisher Dec. 29 is that it is another case of someone sounding off on a subject of which he is obviously ignorant.

The Detroit Times was not far off in its handling of the two stories referred to, and I suggest that you consider the following factors in re-evaluating the matter.

• The story about the local accident involved a mishap which you must admit was quite unusual and sensational, and probably was witnessed by several thousands of persons. Everybody in Detroit and that area was interested in the foolish stunters who risked their lives and lost.

We had a similar thing occur here, and when the stunt plane crashed with two lives lost, and the newspaper ran a picture and story on the front page the following day, the promoter was very angered and took me to task. He wanted to know why the crash rated bigger play than his advance publicity stories on the air show, which naturally had been cut to a minimum. My answer was that he ought to devote his time to prayers for forgiveness for promoting any such suicide stunt, rather than complaining of the results.

No, the aviation industry ought to police itself and stop these foolish suicides, rather than spend money griping of "sensationalism" in newspaper play.

• The road accident story is simply a statistical round-up story on Labor Day week-end fatalities. There is nothing of a personal-experience nature about it to bring it close to the reader. Admittedly, this carnage on the highways is shameful and when it reaches these proportions (which it does on most holiday week-ends) it is a big story. It was so played on this occasion. Now, let's suppose 449 persons had gone down on an Atlantic ocean liner. In that event, the loss of so many lives in one accident certainly would have been played far above the girl on wing. You assuredly know that, or would you? Maybe not, but it is true. Witness the recent big mine disaster in Illinois. It was played as big as any airplane wreck in most newspapers. I know it was in ours, despite the fact we are far from the scene.

In the Girl on Wing, most of the readers were at or near the scene, and this makes a big difference in evaluating the news value.

Your ad reminds me of Arthur Godfrey's blast at newspapers some two years ago when a nationally known singer (almost as well known as Sinatra) crash-landed a small ship in the middle of a residential area in Los Angeles. He toiled out of his plane and was killed as his head struck the curbing.

Newspapers the country over rightly played this story in a big way, not because a plane was involved, but for other reasons, the chief one being the singer then was a popular favorite and his death under any circumstances was big news.

Godfrey was loud and long in his complaint over the radio. He accused the news papers of being biased against airplanes, and of deliberately damaging the good name of aviation in general.

He, like you, was wrong. He, like you, just didn't know how news should be played. We who have been in the game for a lifetime like to think we know a little something about it. If we are as wrong as you folks try to make it appear, then the public will pass judgment and the newspapers would have to fold up for lack of interest in what they print.

I have no bias against aviation and planes, and I don't think many editors do. I fly in them, and expect to continue to do so. These little "one-horse" wrecks of stunters and small planes do not disturb me greatly, though I confess that the recent series of crashes of larger planes did cause me to pause. I would be the first to applaud anything you might do toward furthering safety measures of the airlines. But I don't think you are justified in your criticism, and I think you're wasting your energy—energy that ought to go toward more useful purposes. Think it over and let's hear more from you in E&P.

W. G. Womble, Jr., City Editor
The News & Observer
Raleigh, N. C.

The publisher of Aviation Week purchased a full-page ad in Editor & Publisher Magazine Dec. 29 to reproduce the editorial which appeared here Dec. 17, entitled, "Fighting Unfair Headlines." The ad was published in the interest of aviation.

Dear Mr. Womble—Your letter will be enlightening to people in aviation who don't understand viewpoints like yours any more than you understand some of ours. It simply doesn't make any sense to some of us when a paper like the Detroit Times gives a bigger, blacker headline to a stunt plane that crashes with a girl wing-walker and a pilot than it gives to a story of 449 persons killed—a new record—by autos over Labor Day, or a bigger headline than it gives to the entire Korean war. If aviation were younger, you wouldn't hear our complaints, but millions of people are not as smart as you and they still associate every accident, even by damn fool stunters, with dangers of all aviation.

Frankly, I disagree with your contention that everybody in Detroit was interested in the foolish stunters. Some of you editors are miles off in your appraisals of what the people "want."

We have no sympathy for your local air show promoter. We detest the foolish, dangerous stunt shows, too. We have been trying to get aviation to "police" itself on stunting for two years, partly because of just such a news attitude as yours.

The Labor Day record death toll on the highways may be just a "statistical" round-up to you. To us, it is an awful lot of people dead, killed in violence, and very close to home because nearly everybody has an automobile, and it can happen to us all. The mine disaster is irrelevant. But the Korean war and 449 highway deaths were reported in the same edition of the Detroit Times, and both were considered less important than the girl on the wing. That makes no sense to us.

We can't get excited about the Godfrey incident.

But we do object strongly to your saying that there is only one way to "play" news. You must know so well that it depends on the policy of the individual newspaper and the men who do the editing and headline writing. We venture that not all papers, by any means, would have overplayed the wing stunter's crash as did the Detroit Times. It is only the Times type of editing we are fighting with, wherever it may be.

If there were only one "right" way to play the news, we would not see stories on page one of the New York Times or Herald Tribune that we don't even find anywhere in the Daily News, for example. Every paper has its own evaluation of news and news importance. To say there is only one right way, or that we are entirely wrong in our attitude toward the Detroit Times' policy that day, just stretches credibility too far!

The most discouraging part of your letter, however, is your opinion that we are wasting our time even in disagreeing with one newspaper! When the editors of the newspapers of the country become so biased as to refuse to listen to anyone who criticizes the news judgments of even a minority of newspapers, then we have reached a sorry state, indeed. Surely you don't think critics of the daily press are wasting their energies. Do you?

R.H.W.

"Hands off" FLYING SAVES LIVES!

Pilot down! Another job for the Navy's famed air-sea rescue team. With the Piasecki HUP helicopter . . . equipped for "hands off" (automatic) flying . . . the Navy goes into action.

► The HUP is hovering while automatically stabilized by the Sperry A-12 Gyropilot™. Automatic stabilization greatly facilitates hovering over a target, as adjustments are then required only to correct for changes in wind drift.

► *For the helicopter pilot . . .* "Hands off" flying reduces pilot fatigue by freeing him from "flying" constantly with both hands and feet. He is free to concentrate on navigation, communications, rescue and submarine search duties while the automatic pilot takes over.

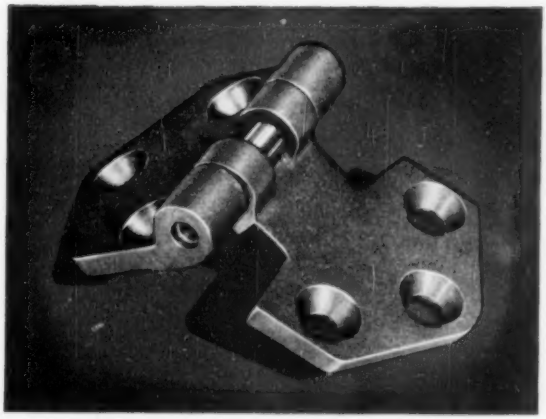
► *For the Navy . . .* Through the use of the Gyropilot, the HUP has full automatic stabilization in yaw, pitch and roll—the ultimate aim in the rotary wing field. Thus, military uses of the helicopter are almost limitless.

► On all missions, the Gyropilot greatly improves the ability of the helicopter to fly in reduced visibility, to maneuver automatically on take-offs and landings and to make automatically stabilized instrument landings through low weather ceilings.

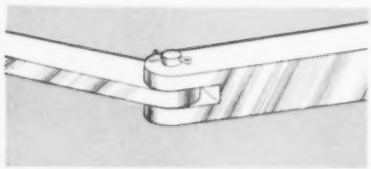
SPERRY GYROSCOPE COMPANY

DIVISION OF THE SPERRY CORPORATION, GREAT NECK, NEW YORK • CLEVELAND • NEW ORLEANS • NEW YORK • LOS ANGELES • SAN FRANCISCO • SEATTLE

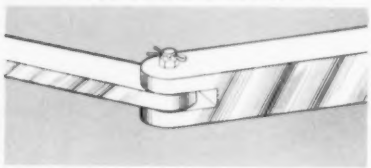
How to replace hinge pins and cotter pins with ROLLPIN self-locking fasteners

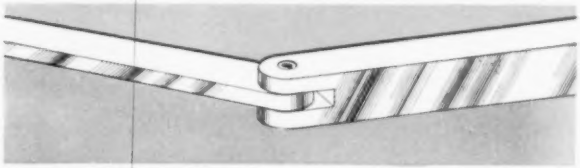


Rollpin replaces hinge pin for faster assembly of hinges. Inexpensively and simply driven in place, it cuts assembly costs. Constant spring tension holds Rollpin firm against vibration on heavy-duty automobile door hinges—on lightweight sheet metal hinges for meter or instrument panel covers.



IF YOU DO THIS ▲ OR THIS ▼ . . .





TRY THE ROLLPIN WAY INSTEAD . . . Rollpins offer many advantages as pivot and clevis pins for linkages or yoke assemblies. Heat-treated to provide excellent fatigue resistance and wear characteristics, Rollpins fit flush, grip firmly in the outer or inner members, depending on your design requirements, and are simply, inexpensively pressed in place. They are faster to install than cotter pins or safety wire . . . straight edges protect workers' fingers and clothing. Rollpins are readily removed with a punch . . . can be used again and again . . . assure simplified maintenance.

USE ROLLPINS (1) To replace set screws and rivets. (2) To pin or key gears . . . pulleys . . . levers . . . knobs. (3) As locating dowels, stop pins or shafts for small gear trains.

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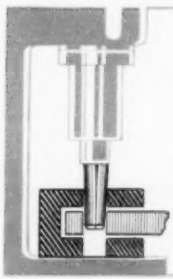

HERE'S HOW ROLLPINS PROVIDE A VIBRATION-PROOF FIT

Rollpins are easily pressed into production drilled holes—chamfered ends facilitate automatic or manual insertion.

Rollpins compress as they are driven—are self-retaining in production drilled holes—fit flush. Secondary hole-reaming or riveting operations are eliminated.

Constant spring tension against walls of hole lock Rollpins permanently in place until deliberately removed with a pin punch. Rollpins don't damage the hole and can be used again and again.